File

Toronto Office

The Province of Alberta

IN THE MATTER OF "THE NATURAL GAS UTILITIES ACT"

—and—

IN THE MATTER OF an Enquiry into Scheme to be adopted for Gathering, Processing and Transmission of Natural Gas in Turner Valley

G. M. BLACKSTOCK, Esq., K.C., *Chairman*

Dr. E. H. BOOMER, F.C.I.C., *Commissioner*

Session:

CALGARY, Alberta January 22nd, 1946

VOLUME 64

I N D E X

VOLUME 64

January 22nd, 1946.

WITNESSES

E X H I B I T S

VOLUME 64

January 22nd, 1946.
Tuesday, 9.30 A.M. Session.

MR. CHAMBERS: If the Board pleases, I would like to speak to the Agenda because at the time we adjourned some weeks ago I think the Board indicated that it would go on with the absorption plant matter. The Royalite are having statements prepared. As a matter of fact right after the adjournment, sir, we arranged to have an increased staff work on that matter and my present instructions are that it will probably be during some time next week before the thing is completed. Now that will not give Mr. Hamilton time to do any checking by the 4th and in any case this matter has occurred to me that while these statements should be available for the purposes that my learned friend wanted to cross-examine Mr. Mercer about, that so far as going into the absorption plant in toto it does occur to me we would probably make better progress in the end if we could clean up the main part of this Hearing, and it boils down to this, sir, that I do not think we will be ready for the 4th to go on with the subsequent inquiry of the absorption plant. Those statements will be available, the 4th, but I do not think they will have been checked.

THE CHAIRMAN: By Mr. Hamilton ?

MR. CHAMBERS: Yes, but it did seem to me - I know there are certain other matters that I could - in connection with this part of the Hearing occupy some of the time of the week of the 4th, and one of the reasons I bring it up now is that I propose to bring in another witness from outside in connection with the absorption plant. Whether or not I need to use him in another phase of this Hearing will depend upon

other witnesses that may be put in and the suggestion that I am now advancing is that we should direct ourselves to completing all the evidence so far as the main part of the Hearing is concerned. That, the absorption plant proper so far as the division of price be not gone into until that is all completed although I will have those statements ready in so far as they may be pertinent to the first part of this Hearing.

THE CHAIRMAN: What other evidence is there still to be adduced with reference to this part of the Hearing we are now on ?

MR. CHAMBERS: One question I put to Mr. Zinder yesterday. I propose to bring some evidence to show coal prices in 1929 to 1939. That is one thing that I expect to be ready to put in on the 4th and I have Mr. Stevens-Guille to go into the box on one or two matters that have arisen in the course of the Hearing and so far as I am concerned I think that is all I have in mind, subject of course to other evidence that might be led by other parties.

THE CHAIRMAN: You have evidence to put in today or tomorrow, Mr. Steer ?

MR. STEER: Yes.

THE CHAIRMAN: Do you know of any other evidence you will have at the moment. I do not want to suggest you won't be allowed to bring any, do you know of any ?

MR. STEER: No I rather think now there is just a possibility I may ask Mr. R. E. Davis to come back.

THE CHAIRMAN: Apart from the absorption plant, Mr. Harvie, have you any further evidence ?

MR. HARVIE: Just dealing with the absorption plant situation for the moment. After your direction we were ready

to proceed on the 4th, I took the matter up with our accounting staff and as you are aware all our absorption records and material are in Toronto and I have just had word from Mr. Donellan that in the course of the next day or two most of the information that he thinks Mr. Hamilton will wish to look into will be made available to him here. But so far as having our submission prepared we are not ready with that and it will take some time after that before we are ready with that submission. As you will remember the arrangement was that the absorption plant was really to take place at the end of this Hearing and we have felt that maybe we would be largely guided in a lot of matters dealing with the absorption plant as the result of directions and judgment in this Hearing, such as whether it will be necessary to have an independent appraisal of the plans submitted as part of our submission and of course so far as operating costs were concerned they will almost entirely depend upon the orders made in connection with this Hearing as to what costs will be made by the absorption plant. So far as that is concerned, sir, we are trying to make available to Mr. Hamilton almost all that is possible in connection with that branch. Now in connection with this part of the Hearing, other than cleaning up one or two matters, we do not propose at the moment to produce any new evidence of any extent, other than the matters left unfinished on the Agenda. For instance, the matter of new contracts and revision of old contracts.

THE CHAIRMAN: Of course I think that must necessarily await whatever decision I may give.

MR. HARVIE: We feel that way Mr. Chairman. I just wanted to make certain of it.

THE CHAIRMAN: Yes, I think that is so.

MR. HARVIE: I know we will know where to start then.

THE CHAIRMAN: I have some suggestions to make as to that when the time comes. We may not need a Hearing on that at all.

MR. HARVIE: As far as contracts are concerned ?

THE CHAIRMAN: Yes.

MR. HARVIE: I can quite imagine that being the case.

MR. CHAMBERS: There is one thing that I learned about this morning. That the Court of Appeal has dealt with the Appeal. I understand my friend, Mr. Blanchard, knows what the decision is but roughly my information is as I gleaned it this morning, that the first Order of the Board was upheld and the second was not.

Now my recollection is that that means the first Order is that the Board is entitled to go into the Gas Company's books if it considers it is relevant to this Hearing. That may affect what we are talking about.

THE CHAIRMAN: Then I am coming to Mr. McDonald. What further evidence will you have ?

MR. McDONALD: I feel it will be necessary to have the evidence from the Gas Company's books and the only other matters outstanding as far as the producers are concerned is the south end producers' agreement which is more a matter between the producers than a matter to be brought before the Board. It does not affect really the price fixing in this particular Hearing. But I do think that the submission by the Gas Company and any other submission by the City in regard to the matter of price in the City of Calgary should be taken care of shortly.

MR. STEER: I will get instructions today as to what the attitude of my Clients are.

THE CHAIRMAN: And we may be going a little further.

MR. STEER: Yes, might.

THE CHAIRMAN: I was not overlooking that possibility. Mr. Fenerty, will you be calling any evidence at all ?

MR. FENERTY: Well I think I will call a little evidence in connection with the matter we have here. I think I will put Mr. Davies on the stand as to the discussion as to coal prices. I had intimated to the Board that there might be evidence called as to other reserves. I am having some difficulties in obtaining witnesses and I do not know whether I will have any other evidence or not.

THE CHAIRMAN: And Mr. Blanchard, you have the Appeal Court on the 11th ?

MR. BLANCHARD: Yes, Mr. Chairman, I have. I was wondering, possibly if Mr. Steer gives us a green light, Mr. Hamilton can start on these books right away and I do not know how near he will be to making a report by February the 4th. It depends upon the intensiveness of the investigation. I do not think there is any more evidence, subject to my having an opportunity of discussing further evidence as to coal prices with Mr. Chambers. It had been my intention to call some evidence on that but it is no use duplicating.

THE CHAIRMAN: It looks as if we will not be able to go on with the absorption plant on the 4th.

MR. STEER: I wonder if I may ask a question in regard to that. There is some suggestion that this absorption plant hearing is a hearing within a hearing. Am I right in thinking that those of us who are interested in these proceedings are entitled to use in connection with any aspect of the case any evidence that is brought forward in the absorption inquiry. That in my submission is the position in

which we ought to be and I am raising it now so that we will know what preparation we should make.

THE CHAIRMAN: The absorption plant actually I think is a separate Hearing. It deals with an entirely different phase of the Inquiry to that which we have been on. I suppose if anyone can qualify by showing some interest they would be entitled to participate in it.

MR. STEER: I would certainly think that I am interested.

THE CHAIRMAN: Well we are not going to be ready to go into that for a while and we will have to consider that but if we have nothing to go on with on the 4th of February we can clean up the tag ends we are speaking of. We cannot sit on the week of the 11th.

MR. CHAMBERS: There is one matter in connection with the Madison rate base that Mr. Hamilton is to check further. The material is now prepared ready for checking by him. It has to do with the question of adjustment of historical costs. Assuming that he can check that information between now and the 4th I do not see why we cannot proceed with that. I do not think it will be long. As I say I can have Mr. Stevens-Guille cover the matters I have in mind and so that will take part of the week and then the question of the coal prices and it has occurred to me if the other parties interested have any evidence that is the time we should try to make a clean up as far as possible.

(Go to Page 5061)

THE CHAIRMAN: I think if need be we can sit morning and afternoon for those three days.

MR. CHAMBERS: Yes.

THE CHAIRMAN: And be finished with this part of it.

MR.HARVIE: What about Mr. Mercer's evidence?

THE CHAIRMAN: Well, we will deal with that when the absorption plant hearing is going on.

MR. HARVIE: I think as far as one statement is concerned, it might be relevant to this Hearing, but I do suggest, and I agree with your suggestion, Mr. Chairman, that the absorption plant hearing is a separate hearing, and as far as I am concerned, I am going to ask that it be dealt with that way and not get mixed up into this hearing.

THE CHAIRMAN: Well I think I have already ruled on that, Mr. Harvie. I have a horrible prejudice about changing my mind. I do not think I am going to change my mind. Well then, we will go on on the 4th and sit mornings and afternoons for three days, if need be, to clean up all these tag ends, and then we will discuss the date for the beginning of the absorption plant hearing, and I hope we can go right through then. There is another thing you might think over, and that is as to what length of time you want to prepare argument, or are you going to argue?

MR.BLANCHARD: I know I would certainly like a month myself.

THE CHAIRMAN: Well you can think about that too.

MR.HARVIE: That would be taking away our vacation. It will take some time to read all the statements and the evidence.

THE CHAIRMAN: And then I will have a decision nearly written by the time you have prepared your arguments.

MR. HARVIE: I think it might be well to consider the situation, if a month is required after the completion of the evidence in this hearing, and then we interject the absorption hearing, and then have to go through all that before we proceed with the other,well, we will be into next year before we get any place.

THE CHAIRMAN: Well, I see we cannot raise very much of an advance at this time here, so that we will sit on the 4th of February and do what we can. All right, Mr. Chambers.

MR. CHAMBERS: I was through with Mr.Zinder except for a couple of matters with regard to the questions that I asked, and I was wondering if this could stand until after lunch. I think Mr. Zinder would prefer to have it that way.

MR. ZINDER: Yes.

MR. CHAMBERS: I will deal with him in the cross-examination on the other phase.

THE CHAIRMAN: Any cross-examination, Mr. Harvie?

MR. HARVIE: I have no questions.

THE CHAIRMAN: Mr. Blanchard?

MR.BLANCHARD: I have nothing, Sir.

.....

HANINA ZINDER, recalled, examined by Mr. McDonald, testified as follows:-

Q There is just one thing I have, Mr. Chairman. Would you refer to Page 10, Mr. Zinder. Yesterday afternoon you deleted starting with the words "The experience" to the end of the paragraph, the first paragraph on page 11. Now, have you anything to say with regard to the material in that paragraph now?

A Why, I would like to say this, I have suggested there in that paragraph that it is possible for the over-all average to go down and the component parts, some of them go down and some of them go up. The information first received from the Company happened to be a good example of that, and I used that. I still think that there is an example in the revised information received from the company and I would like to refer to what happened between 1935 and 1936. In that period the over-all average of sales went up, but the commercial sales went down from an average of 697 to 687. I think that was all, Mr. McDonald.

Q That is all I have.

THE CHAIRMAN: Anything further from this witness?

MR. FENERTY: May I ask just a couple of questions?

THE CHAIRMAN: Yes.

.....

CROSS-EXAMINATIO N BY MR. FENERTY

Q Mr.Zinder, dealing with this matter that Mr. Chambers examined you on towards the end of his examination about the rate per customer, about the amount consumed by each customer going down in certain periods, and you had these periods between '28 and '35, and again between '29 and '39. Now, I suggest to you that these statistics would be influenced by the fact, and it is a fact, that smaller houses were constructed during some of those periods than previously, smaller houses and better insulation. That might account for the drop per capita, would it not, to some extent?

A Yes, that might.

Q And if during that period you also had a building boom, or a lot of new buildings constructed, that would account for the

increase in customers?

A Account for increasing what?

Q Customers on the line?

A Yes.

Q So that some of these statistics that we are referring to that you used to illustrate the situation may be accounted for in whole or, if not in whole, in part by the construction of smaller better insulated buildings and increase in construction?

A That is entirely possible, but I would like to add this, Mr. Fenerty, that, for example, in 1937 the Company already had approximately 17,000 domestic house-heating customers in Calgary.

Q Yes?

A And to have additional homes that might be built with good insulation and built for gas heating to influence that average, it would take quite a few of them. It would take quite a substantial amount.

Q Yes?

A I think it would, or might influence the average, but I have doubts that it would change the trend.

Q I see. Now, my friend, Mr.Chambers, also discussed the matter of the price of coal, coal being cheaper in the period that he mentions than perhaps it is today. I take it you do not know personally anything about those figures?

A I do not. I do not know what the prices of coal were in Calgary around 1929 to '39.

Q And do you know whether during those periods my friend referred to the present installations burning low-priced, smaller grades of coal were available.

A I do not know what the coal situation was at that time, no.

Q You do know, of course, that these smaller grades, such as,

smaller grades, such as nut and slack and so on, are cheaper everywhere than the lump grades, and higher grades?

A To my knowledge they are cheaper.

Q And is it also your knowledge from the study you have made of it, that with the modern automatic installations that you can get much higher efficiency with these cheaper grades than with lump coal handled manually?

A The question of the efficiency involves many factors in addition to the type of coal that is burned. For example, you can burn nut coal, let us say, on a grate or a furnace that is designed to burn lump coal or some other type of coal and your efficiency would not be as good, you see.

Q I am speaking of the ordinary way that the lump coal was handled manually as compared with the cheaper grades, nut, pea and perhaps slack, handled with the latest devices automatically, the down-draft and coking furnaces and so on?

A Assuming with those factors you would get an increased efficiency.

Q And that unless we have all of those factors, I take it it would be impossible to deduce anything from these figures that we have discussed as to prices of coal and the saturation of the market at higher gas prices at an earlier era?

A I cannot answer that question, Mr. Fenerty. I do not know what is going to be introduced.

Q I say you would have to have all these factors in order to deduce anything from them?

A I would not want to say now what you would have to find.

Q I want to read a clause to you from the Research Council Report, Number 46, Research Council of Alberta, which is a Government publication. This paragraph is headed "The stoker,

snd competition between coal, oil and gas".

MR. CHAMBERS: Would you give us the page?

MR. FENERTY: Page 6.

Q "The automatic domestic stoker is a reply of the coal industry to the competition of natural gas and oil as fuels for domestic heating. Coal is in general notably cheaper than either gas or oil; but gas and oil are cleaner and more convenient and many householders are willing to pay the higher price for the sake of convenience. Gas in particular is brought to the house in a pipe and can be fed to the burner simply by turning on a tap. The heating system also can be readily subjected to thermostatic control, whereby the heat supplied to the house is restricted to the heat required to maintain the desired house temperature."

Now then it goes on:

"The hand-fired, coal furnace usually burns lump coal, and this coal may have to be shovelled into the furnace twice or three times a day. The grates may have to be shaken each time of firing,"and so on.

Now, I have given you a picture of that whole extract. I want to go back to this again, "The automatic domestic stoker is a reply of the coal industry to the competition of natural gas and oil as fuels for domestic heating. Coal is in general notably cheaper than either gas or oil; but gas and oil are cleaner and more convenient."

Now did it occur to you if there is any foundation for that statement in the Government publication, that there must be some difference in efficiencies between these modern installations?

A Is that, might I ask, Mr.Fenerty, speaking for Alberta or

for the Dominion?

Q No, this is Alberta?

A Just Alberta?

Q Yes. There must be a great deal of difference in efficiencies as far as the Research Council has been able to ascertain for them to make such a statement, wouldn't that follow?

A I have not seen the data supporting that statement.

Q You are seeing it now. And wouldn't it follow that in order for a responsible organization to make that statement that there must be a great difference in efficiencies between coal and gas as compared with the figures that have been placed before the Board, that is what I am getting at?

A I would like to see first, Mr. Fenerty, the support for the statement.

Q You would want to inspect it?

A Naturally.

Q All I am saying now is, wouldn't it follow that the Research Council exploration indicates a much greater degree of efficiency for coal as compared to gas than the figures that have been given here, that is the only thing I ask it for?

A It might not be alone in the question of efficiency, Mr. Fenerty. Now, this just doesn't cover the Calgary market or the Calgary area, this covers, I assume, the whole of Alberta. I don't know, maybe the whole of Canada. I don't know if there is more than efficiencies involved. There is the question of the price of coal, there is the question of the price of gas. Those are the factors that you have to take into account.

Q Well, can we go this far, and I will leave it, if those statements should by any chance be correct, there are a lot of factors that you do not know and haven't considered, is that a fair statement?

A Well I do not know whether they have or not, Mr. Fenerty.

Q But I say, you will answer that won't you, if these statements, assuming that they are correct . . . . put it that way, you do not know - but assuming they are correct, there must be a lot of factors in this local situation that you have not considered. Is that not the logical conclusion?

A No.

Q I will put it this way, either there are a lot of factors you have not considered or you are absolutely wrong if these statements are correct. It must be one or the other.

A I do not agree with that, Mr. Fenerty, because I would like to say this as I understand it, it is a general statement dealing with Alberta, from what you have told me.

Q Assuming they deal with Alberta.

A All right, assuming it deals with Alberta it satisfies me that a conclusion like that could be reached or be true with regard to everywhere else except Calgary.

Q I see.

A So that it is a general statement with regard to what is generally true in the Province.

Q I will leave it at that.

MR. FENERTY: I think perhaps we might put this in, it is a Government publication, printed by the King's Printer. I have particular reference to page 20, Report Number 46 of The Research Council of Alberta.

DOCUMENT IN QUESTION IS NOW MARKED EXHIBIT 136.

I might say that the reason that had not been brought out before is we had been waiting for some time and it has just come out.

THE CHAIRMAN: What is the date of that report?

MR. STEER: 1945.

MR. STANLEY DAVIS: Just issued right now.

THE CHAIRMAN: They had another report on Alberta coals 18 months ago, hadn't they?

MR. STANLEY DAVIS: Yes, that is 1935 "Coals of Alberta". This Report that has been put in now is an investigation they made into stokers, over-feed and under-feed stokers for domestic use and it is pertinent to this Inquiry.

THE CHAIRMAN: I am surprised that I did not get one, because they generally send me these.

.....

CROSS-EXAMINATION OF THE SAME WITNESS BY MR. CHAMBERS.

Q There are one or two questions I would like to ask you, Mr. Zinder, arising out of the examination of my friend, Mr. Fenerty. I want to refer you to a statement on page 6 of this Exhibit 136 where it says: "Coal is in general notably cheaper than either gas or oil." I am suggesting to you, Mr. Zinder, that that statement as appears there in the context is a general statement not applicable to any particular area anywhere, Dominion or Province or continent.

A I could not say, Mr. Chambers. It says "in general", which is very broad. It does not say in Alberta; it does not say in Canada or in the United States. Mr. Fenerty asked me to assume it was in Alberta, but I do not see any supporting Tables or anything of that kind.

MR. FENERTY: I did not mean to say it was but I assumed it was. I just got it this morning. I said "assuming it is in Alberta".

A I do not know whether that assumption is correct or not.

Q MR. CHAMBERS: And I suggest to you, in applying that

general rule or that general statement to any particular location in order to see whether it is applicable to that particular location, one should give consideration or study to the particular area as to the coal supply and the gas supply.

A That is right and the price of these particular fuels.

Q For instance, as I understand it, in certain portions of the United States there are no coal resources, natural resources within a close range. Can you give me any examples?

A Yes, the State of Texas. There is no coal in many parts of the State of Texas within a long range.

Q And in the State of Texas as I understand it there are large petroleum reserves.

A That is right.

Q Are there any gas reserves?

A Large gas reserves also.

Q So that, in applying that or considering that general rule as it is applicable, say, to the State of Texas, you would have to give consideration to those two factors?

A Oh yes.

Q Where does Texas ordinarily get its coal from, can you tell me?

A For fuel there is not a large amount, comparatively, of coal burned in the State of Texas, because there is so much gas and so much oil. I would judge what coal does come into Texas might come in from West Virginia or from Tennessee and some might even come in from Alabama. But all are quite some distance from Texas.

Q One other question my learned friend put to you and I am not certain whether he asked you to assume it, but I just

want to make sure whether you have any opinion on it or whether you agreed with the assumption. I think he mentioned that if, during this period from 1929 to 1939 that the smaller houses and types of installation, a building boom and so on might affect the situation. You have no information yourself as to whether that is or is not so with respect to that period?

A That is right.

.....

CROSS-EXAMINATION OF THE SAME WITNESS BY MR. BLANCHARD.

Q Do you know of any city where gas users have converted to coal in any considerable degree by reason of cheaper prices for coal?

A I do not, Mr. Blanchard.

Q You mentioned Pittsburgh as an example, I think, as a city where the cost per B.T.U. of gas was higher than the cost of coal delivered there. Is that correct?

A I gave no figures on Pittsburgh.

Q You did not give any?

A No, not that I recall.

Q But your general idea was that Pittsburgh was an example of a place where the cost of gas per B.T.U. was higher than the cost of coal laid down?

A No, I do not think so.

Q What I have in mind is this. There are a number of imponderables in this matter that are not . . . . . that it is impossible to weigh in endeavouring to answer the question whether customers will or will not change over from gas to coal on the basis of cost. Those imponderables are such

things as cleanliness, convenience and smokelessness and so on?

A That is right.

Q If you had a city in Alberta where the actual cost of coal per B.T.U. was cheaper than the cost of gas per B.T.U. that would give you some evidence in the light of experience as to what a community will do in the way of changing over from gas to coal.

A That is right. I know of no such City.

Q Do you know of the great city of Medicine Hat?

A I have heard of Medicine Hat.

Q Do you know there is coal right at the boundary of Medicine Hat, good coal?

A So I have been advised, yes.

Q You have not inquired about the cost of laying coal into a basement in Medicine Hat?

A I did not get that.

Q You have not inquired as to what it costs to lay coal into a basement in Medicine Hat?

A I have not.

Q If it could be shown that it is cheaper than gas per B.T.U. there you would have an example of a community with, I suppose, 100% gas saturation where coal could be bought cheaper than gas. If those are the facts, that kind of an example would be the most valuable we could possibly have as to the reaction of customers, gas consumers to cheaper fuel.

A I think you are right, Mr. Blanchard.

.....

CROSS-EXAMINATION OF THE SAME WITNESS BY MR. STEER.

Q May I ask one question? Mr. Zinder, you did not appear to agree with the Research Council in the passage that my learned friend, Mr. Fenerty, referred you to on page 6. I am going to read you a statement from Page 21 where they are referring in this same Report to Crows Nest area coal. Now your Blairmore coal is Crows Nest coal is it?

A Yes, sir.

Q Now the statement made is that "the coal gave trouble in the test stoker owing to its coking tendency and to its failure to clinker." Do you follow that?

A Yes.

Q You do not agree with that?

A No, I have not said that I disagree entirely with that Report.

Q Oh no, I am referring you to the statement made on page 4 of your Submission. I gather from this statement that Blairmore coal or Crows Nest coal is not suitable for stokers in the opinion of the Research Council of Alberta. Is that what you gather?

A From that statement, yes.

Q Very well. On page 4 you say "Blairmore coal is suitable for stoker use since it is a medium volatile bituminous coal with good coking qualities." Now either you are wrong or the Research Council of Alberta is wrong.

A With regard to that information, that was information received in our inquiries here in Calgary.

Q That is right, is it not, either that statement in your Report is wrong or the Research Council statement is wrong, one or the other?

A That is right.

MR. McDONALD: Do the Research Council refer to Crows Nest area coal or Blairmore coal?

MR. STEER: Their reference is to Crows Nest area coal and Mr. Zinder said Blairmore coal was a Crows Nest area coal.

MR. McDONALD: Have you explained to Mr. Zinder how many different kinds of coal there are in the Crows Nest area?

MR. STEER: You can do that.

MR. McDONALD: All I am asking is that you put a fair question to the witness.

MR. STEER: You can re-examine him.

Q I want to refer you to a statement made with regard to Drumheller coal. The next sentence, "The lack of these qualifications in the Drumheller coal works against its successful use in a stoker." That is your statement?

A Yes.

(Go to page 5075)

Q Now I refer you to Page 23 "Drumheller area coal" and the statement by the Rosearch Council is:

"Coals from this area are satisfactory for either stoker' either of two types of stoker I take it:

'except for possible clinker trouble".

Now you say that Drumheller coal is not suitable for stoker and the Research Council says it is, that is right is it not, and I am talking now about Drumheller area coal ?

A That is right.

MR. STEER: That is all, thank you.

Q TO THE CHAIRMAN: I suppose you have no data as to the number of stokers there are in the City of Calgary, I suppose you have not ?

A No, I made no survey, Mr. Chairman.

Q What do they cost ?

A I do not know what they cost here.

Q Do you know what they cost in the States ?

A I would be making a guess but right now based upon information - -

MR. STEER: Mr. Chairman, should we have guesses ?

THE CHAIRMAN: Well he can give me the range of prices of stokers.

A It has been quite a time since I have seen any prices on the cost of stokers so I had better say I do not know.

Q They cost more than $100.00, do they not ?

A Yes, furthermore my experience is that the cost is such that for the average householder it represents an investment that they give consideration to before making, that is a good deal

of consideration to.

Q It would seem to me a person who could afford to buy a stoker would not care very much what he pays for gas, would that be a reasonable deduction ?

A I do not think so, Mr. Chairman.

THE CHAIRMAN: All right. Anything further from Mr. Zinder. All right, Mr. Zinder, thank you.

MR. BLANCHARD: Mr. Zinder of course is coming back.

THE CHAIRMAN: In the afternoon. Now can we go on with your witness, Mr. Steer ?

MR. STEER: Yes, Mr. Chairman, I will call Mr. Brownie.

: : : : : : : :

FRANK AUSTIN BROWNIE; having been recalled,

Examined by Mr. Steer, testified as follows:

Q Now you are under oath already, Mr. Brownie ?

A Yes.

MR. STEER: Shall I proceed Mr. Chairman ?

A Yes.

MR. STEER: All right, Mr. Brownie.

A Reading first from the "Foreword".

On April 3rd, 1945, evidence was presented before the Natural Gas Utilities Board on behalf of the Canadian Western Natural Gas, Light, Heat and Power Company, Limited, as to estimated future gas requirements of the Company's system. A brief explanation was made of the studies leading to these estimates including references to the various factors influencing future trends such as the ending of the war, less prosperous conditions, improved appliances, etc. After studying all forseeable factors affecting future requirements, it was concluded that the general trend would be sharply downward following the war. In examining the variations of gas requirements in past years, it was pointed out that rate decreases had been a factor. However, in making estimates for the future, no consideration was given to the effects of possible rate changes in future years. These estimates, as was stated, were based on the assumption that the price paid for natural gas at Turner Valley by the Company would remain at its present level.

It is now felt that past testimony should be supplemented by this further submission to the Board dealing with the effect on the Company's estimates of a

possible increase in gas rates.

Now going over to the "Introduction", the title being:

"Future Markets as Related to Gas Rates"

And the "Introduction".

This is a report dealing with some phases of the market prospects of The Canadian Western System in the immediate future.

Local gas rates are admittedly low in relation to rates in most communities in the United States. Superficially, it may be reasoned from this that rates may be increased without affecting the gas consumption per customer, and as a result that such an increase would result in a corresponding increase in gross revenue. Gas consumption per customer in Southern Alberta is high very largely because of the low rates and as a result it is in the power of the consumer to adjust his annual consumption within a substantial range to offset any increase in the rate. In other words, the very fact that rates are low results in high per customer use which by its nature may be lowered if rates rise.

Even at present rates other fuels are closely competitive with gas in many instances. In pre-war years constant effort was required on the part of the Gas Company to maintain its market position. Any rate increase would require this effort to be increased many times.

Separate attention is given below to the various aspects of this subject.

DOMESTIC SALES

Domestic consumers will tend to use less gas as the rate increases because:-

(1) For many years the history of Natural Gas in Calgary and the Southern towns has been one of steadily declining rates. The sudden reversal of this trend by a rate increase will have a very important psychological effect. It will cause consumers to take immediate steps to offset an increase in expenditure by reducing consumption.

(2) Many people, particularly those with limited or fixed incomes, budget expenditures very closely and will make every effort to adjust consumption to fit the new rate rather than permit increased expenditure for gas to encroach on other budget items.

(3) Other sources of heat will be more closely competitive and in some cases more economical.

Methods Available to Domestic Consumers of Reducing Annual Consumption.

(1) By house insulation.

Appendix 1 herein is a quotation from "House Insulation" by C. A. MacConkey, Bulletin #693 of the National Research Council of Canada. It indicates that up to 14.5% theoretical fuel saving will result from ceiling insulation alone in two storey houses. Such buildings normally lose about 16% of their heat through the roof.

In Interim Bulletin #33 of the American Gas Association Subcommittee on Gas Equipment, it is stated, "Insulation in bungalows should show the greatest saving in per cent because the heat loss through the ceiling of a bungalow is from 25 to 35% of the total heat loss."

As reported in Bulletin #355 of the University of Illinois Engineering Experiment Station, by actual test the fuel saving resulting from insulation was 78% of theoretical.

In Appendix 2 herewith are presented data showing the effect of insulation in specific Calgary homes. These were selected only because their histories were readily available and therefore they are in effect random samples.

Q MR. STEER: Perhaps it would be wise to look at that now, Mr. Brownie.

A Appendix 2, Case 1.

This was a bungalow, the ceiling of which only was insulated with Mosstex late in 1936. The annual gas consumption in the three years immediately prior to insulation was 287 MCF per annum. The average of the eight years following insulation was 245 MCF. The annual saving was 42 MCF or 14.6%.

Now to give effect to possible variations in atmospheric temperature I show the annual degree days - -

Q Just what do you mean by that, Mr. Brownie ?

A Degree days are commonly used to measure heat requirements in the gas industry. It is usually assumed that the average temperature of a house is 65° over the whole 24 hours. If the outside temperature is 64° for a day we require what is called "1 degree day" of heat or heat requirement to keep that house at a temperature of 65 degrees. In other words, degree days are arrived at by multiplying the number of days in any period by the difference between 65 degrees and the average atmospheric temperature during that period and it is usually assumed that those requirements are directly

proportional to degree days.

The average number of degree days per year in the period 1934 to 1936 was 8,780; in the period 1937 to 1944 it was 8,670.

In other words there were less, - the heat requirements of the second period was 1.4% less than the first period, whereas the reduction of the gas consumed was 14.6%.

Note: - since annual consumption shown above includes cooking, water heating, refrigeration and garage heating, the saving in gas used for house heating only would be around 25%.

On the second case, also a bungalow with the ceiling insulated with Mosstex in 1939, the annual saving was 18.6%. The decrease in heat requirements 3.8% and the same note applies as in Case 1.

Continuing with the second paragraph on Page 3:

It should also be noted that other advantages accrue from insulation, notably increased comfort, so that many customers faced with increased fuel bills could be easily sold on the benefits of insulation.

Other related means of saving fuel open to the customer are to put on storm windows earlier in the fall and to leave them on longer in the Spring, and to increase the use of weatherstripping.

(2) By the installation of new and more efficient appliances.

Early American Gas Association requirements in respect to domestic gas range top burners, specified

a thermal efficiency of 30%. Current requirements are 40%, an increase in efficiency of one third. Requirements in respect to "Certified Performance" (C.P.) ranges, the highest quality equipment of this kind are higher still at 45%. The effect of modern practice in oven insulation can be seen from the following figures. The maximum permissible heat input per cubic foot of oven space for preheating was formerly 3500 B.T.U.'s, and I should have said "per hour". It is now 3000 B.T.U.'s for standard ranges and 1600 B.T.U.'s for C. P. ranges. Similarly the heat input for maintaining the oven temperature at 500° was formerly 5600 B.T.U.'s. It is now 4000 B.T.U.'s for standard ranges and 3800 B.T.U.' s for C. P. ranges.

It is not possible to place a figure on the true efficiency of the common side-arm water heater because a great deal of the heat is lost to the atmosphere from the tank by conduction and radiation. The modern storage water heater is fully insulated and has a much better fuel economy. Since water heater tanks frequently start leaking as a result of corrosion, there is ample opportunity for replacement of old equipment by new.

From a study of 27 replacements of conversion burners by gas-designed warm air furnaces, by the American Gas Association Subcommittee on Gas Equipment, it was found that an average reduction in consumption of 10.5% resulted (A.G.A.Proceedings 1937). The thousands of converted coal furnaces in use in Calgary and the Southern towns are steadily getting older with a growing tendency towards leakage and a decline in appearance. Thus, there is a trend towards replacement by modern gas furnaces

because of mechanical failure, desire to install air conditioning, and desire for improved appearance in those instances where basements are being converted into living space. Home improvement loans, when equipment once more becomes available, will stimulate this trend.

For a number of years it has been the Gas Company's practice, in the solution of many High-Bill complaints, to recommend the replacement of obsolete burners, and to give all possible assistance in making this replacement. It is estimated that there are thousands of such obsolete burners still in service. Any increase in the price of gas will undoubtedly accelerate the replacement rate.

(3) By more careful control of gas consumption.

1. By lowering house and garage temperatures.
2. By closing off unused rooms.
3. By turning down heating appliances, rather than by opening windows, when the house becomes too warm.
4. By the intermittent rather than continuous use of water heaters and by restricting the use of hot water in dish washing, bathing, etc.
5. By the installation of automotic controls.
6. By more careful gas usage in ranges - turning down gas when water starts to boil, cooking vegetables with the roast, etc.

(4) By a greater use of auxiliary electrical appliances - toasters, waffle irons, coffee makers, etc. This trend has already been noted by the gas industry and would tend to be accelerated by increased rates.

(5) Any rate increase will adversely affect the Gas Company's public relations. This is particularly the case in view of many years history of declining rates. To offset this factor, it will be necessary for the Gas Company to intensify its efforts to reduce customers bills by servicing of present appliances and by recommending more efficient replacements.

(6) By replacing gas ranges with electric ranges.

This danger is particularly important in the case of new construction and kitchen modernization, and especially in new apartment buildings where gas range venting is an inconvenience. The electric industry in co-operation with the large manufacturers of electric ranges, is carrying on an aggressive sales and advertising campaign on a national scale. This campaign, tied into the idea of a modern all-electric kitchen, will undoubtedly so affect the public that many people will be willing to pay a premium for owning an electric range. This may be the case, regardless of the facts in a comparison of gas and electric ranges as to performance and cost.

(7) By replacing gas-fired central heating equipment with coal-fired equipment.

By using modern automatic coal-firing units, especially equipment just on the point of entering the market, much of the former spread in cost between coal and gas can be eliminated, together with many of the other disadvantages of solid fuel.

Drumheller stoker coal can be bought in one ton lots delivered to the customers bin in Calgary for $5.95 per ton. Assuming efficiencies of 55% for coal and

70% for gas, this would be equivalent to gas at 38.5¢. The average domestic rate over the Canadian Western system in 1944 was 28.65¢, to which must be added the 8% sales tax, bringing it up to 30.9¢.

A new unit called the "Anthratube" has recently been developed in the laboratory of Anthracite Industries Inc., a research organization supported by producers of 70% of all U. S. Anthracite. Appendix 3 to this report is a copy of some of the descriptive literature. The "Anthratube" would be adapted to the burning of Canmore stoker coal, which is available now at $8.22 per ton, delivered to the customer in one ton lots. It is reported to be more efficient than former equipment. However, assuming again 55% efficiency for coal and 70% for gas, the equivalent gas cost would be 37.2¢ per MCF. If the "Anthratube's" efficiency should be as much as 60%, the equivalent gas cost would be 34.1¢. It has the other advantages of being completely automatic and highly compact. It is expected production will start early in 1946.

MR. HARVIE: Just at that point, Mr. Brownie, do you know the cost of that equipment ?

A No.

As in the case of the anthracite producers, research organizations have been at work in recent years trying to develop more efficient equipment for utilization bituminous and other high volatile coals. Presented in Appendix 3A herewith are excerpts from a paper by J. R. Fellows, of the University of Illinois, entitled "Performance Characteristics of a Downdraft Coking Furnace". This unit has the advantages of compactness, simplicity, ease of

operation, smokeless combustion and improved efficiency. It is adapted to the burning of nut coal. Drumheller nut can be delivered to the customer's bin in Calgary in small lots for about $6.30 per ton. Assuming efficiencies of 55% for coal (which is commonly accepted for conventional furnaces) and 70% for gas, this would be equivalent to gas at 40.6¢. The efficiency to be expected from the Illinois furnace is not stated. It is stated, however, that in conventional furnaces burning high volatile coal about 20% of the total heat is lost in the unburned gases and that the Illinois furnace burns practically all of the volatile matter. If it is assumed that the Illinois furnace has an efficiency of 70%, coal at $6.30 per ton would be equivalent to gas at 31.9¢. Over 100 of these furnaces are now in use in private homes and seven companies have been licensed to manufacture them.

If for any reason substantial quantities of industrial and commercial business (including refineries) are lost, thus materially increasing domestic rates it would be reasonable to expect important competition from this new equipment.

COMMERCIAL AND INDUSTRIAL SALES

Wartime conditions have tended to work entirely in favour of gas in any comparison of the relative economies of gas and coal. The availability of coal has been uncertain. Where additional labour has been necessary for coal handling, it has been hard to get. Even where the handling of coal has been provided by janitors or caretakers, as a part of their regular duties, the elimination of coal handling has probably been a factor in getting and retaining

this type of labour.

With the ending of the war, both coal and labour will be plentiful. The trend to less prosperous conditions will cause owners of commercial and industrial buildings to search for possible economies in their operations. During the war, considerable plant maintenance had to be deferred. When this is proceeded with after the war, it will be natural to consider the possibility of economies resulting from the use of competitive fuels.

A table presented herewith (Appendix 4) shows costs per ton of coal for various sized loads equivalent to gas at present and various increased rates.

Perhaps we should turn to that Appendix. As indicated, this table is based on gas efficiency of 75%, coal efficiency of 65%. Drumheller coal at 9080 B.T.U. per pound which is a figure taken from the Research Council of Alberta Bulletin, 35, resulting in 17.1 MCF of gas equivalent to one ton of coal.

The left hand column shows the various annual gas consumptions in MCF and the next column shows the equivalent tons of coal and the other column shows, first of all under present gas rates are indicated the prices at which coal would have to sell to equal in cost gas at present rates. That is coal selling at $4.34 in the first line would be equivalent in cost to gas at present rates. If the rate went up two cents, coal at $4.67 would compete on the basis of direct fuel cost and so on.

In the note we say, the 8% sales tax is not taken into account in the above figures. If it were included it would have the effect of raising all the equivalent

coal prices by 8%. This would be the case in all buildings subject to this tax which includes all apartment houses.

I might explain that tax applies to all buildings containing residential quarters. A very large commercial building may have a janitor's suite in the basement and the gas consumption in the whole building becomes taxable and if there were no such dwelling in the basement the building would not be taxable. For example our price of coal at $4.34 goes up by 8% to $4.69 and so on.

Now going back to the narrative.

The figures shown under "Equivalent Cost of Coal per Ton" are the prices at which coal would have to sell to be equal in cost to gas in the quantity and at the rate indicated, on the basis of a direct fuel cost comparison only. For instance, if a customer uses 1000 M.c.f. of gas annually, at present rates, Drumheller coal at $4.34 per ton, would be equal in cost to gas. If coal can be purchased for less than $4.34 per ton, it is more economical than gas. Drumheller stoker coal is readily available at $2.15 per ton f.o.b. cars at the mine. Freight to Calgary is $1.30 per ton. This means that this coal can be delivered in Calgary for around $4.00 per ton. Moreover users of large quantities of coal are today buying Drumheller slack loaded on cars at the mine for $1.00 per ton and less. Laid down in Calgary, this coal would cost $2.30 per ton, or lower. This is close to the cost of gas on even the most favourable High Load Factor rate for large users, and materially lower than the gas cost to medium sized loads. In some cases the newly developed Anthratube, with only a slightly less favourable cost comparison, would be an important competitor because of its compactness and other advantages.

This means that on the basis of a straight fuel comparison in many instances, coal costs less than gas even at present rates. There are, of course, incidental expenses in respect to coal which work in favour of gas. These have been cited as labour, fuel storage, power for stoker operation, and interest on fuel investment. Most customers are not willing to place much weight on these factors in comparing the two fuels. The labour is very often absorbed as incidental to the other duties of a caretaker or watchman. In normal times, the coal storage space in many cases would be used for no other purpose if coal were replaced by gas. Interest on the fuel investment is ignored.

Numerous commercial buildings on The Canadian Western system have continued to burn coal even through the difficult wartime years. This continues to be the case in spite of the constant efforts of the Company to convert these loads to gas. In many others, the economic margin enjoyed by gas is very small and in some cases negative. These loads are maintained on the line only by constant and vigorous effort on the part of the Gas Company. Any increase in the price of gas will make the retention of these loads more difficult still, and will undoubtedly result in losses.

As in the case of Domestic consumers, many avenues are open to the Commercial and Industrial user in his efforts to avoid an increase in his gas bill. The cheaper the fuel, the less necessity there is to employ high class labour to search for and correct possible sources of economy. The following are some of the means by which savings can be effected if the incentive to use them is present.

(1) By the installation of economizers and feed water heaters.

(2) By the utilization of exhaust steam otherwise going to the atmosphere.

(3) By returning to the boiler condensates going to the drain. This and items (1) and (2) apply particularly to large boiler plants.

(4) By closer attention to the insulation of steam pipes.

(5) By closer attention to small leaks in steam pipes, return pipes and boiler.

(6) By checking inoperative and leaking steam traps.

(7) By eliminating air leakage into boilers.

(8) By closer attention to combustion control.

(9) By the replacement of obsolete with uptodate equipment.

(10) By the maintenance of lower building temperatures.

Rising gas rates will also tend to encourage the use of electrical counter equipment in lunch counters and the conversion of auxiliary prime movers from steam to electricity.

DATA RELATING SALES TO RATE

1. Presented herewith is a graph, Appendix 5, taken from a 1944 publication of the Bonneville Power Administration titled "Pacific Northwest Opportunities." This graph shows a plot of average price per kilowatt hour against average annual kilowatt hours per customer. A point is plotted for each state in the union and one for Winnipeg, Canada. An average curve is then drawn through the points. It is interesting to read from this curve the consumption at various rates and to compute the resulting yearly bill at these rates, as in the following tabulation:

In the tabulation in the left hand column we show rates for various points in the curve, varying from

0.8 to 5 cents. In the next column we show an annual K.W.H. varying from 5150 down to 800 and in the last column we show the annual bill. It is notable that that bill is very close to $40.00, varying from $38.00 of a low to $41.40 high.

Rate	Annual K.W.H. per customer	Annual Bill
0.8	5150	41.20
1.0	4000	40.00
2.0	2070	41.40
2.5	1630	40.70
4.0	950	38.00
5.0	800	40.00

It is apparent from this study that the higher the rate, the smaller is the comsumption of electricity. In fact generally speaking, the residential user pays about $40.00 per annum and takes what electricity he can get for that sum at prevailing rates. The Bonneville Publication, in reference to this chart, states, "Most consumers are quite sensitive to the size of their monthly power bills, and consciously limit their use of power so as not to exceed monthly power payments to which they are accustomed."

2. Appendix 6 - herewith is a graph showing similar data for gas service in communities in the State of Massachussetts. The accompanying tabulation shows results similar to those above. That is over a rate variation from 91¢ per M.c.f. to $2.68 per M.c.f. the annual expenditure by the customer remains close to $31.00.

3. It is not easy to show trends comparable with those indicated in 1 and 2 above from data in respect to a single company over the years because of the distorting effect of other factors. However, certain local data are presented

here which support the theory that an increase in rate will tend to be offset by docreased usage.

(a) A tabulation (Appendix 7) is presented which shows a comparison between average annual net revenue per customer of the Calgary and Edmonton Gas Companies for the years 1929 to 1944.

During that time the Edmonton average rate has always been higher than the Calgary rate by amounts varying from over 9¢ to less than 0.5¢ per M.C.F. The average revenue per customer in both companies has varied from year to year with changing temperatures and economic conditions. It is interesting to note, however, that at no time has there been any material difference in average revenue per customer as between the two companies. Moreover, although the Edmonton rate has always exceeded the Calgary rate, the Edmonton revenue has been higher than Calgary in nine years and lower in seven years.

This seems to indicate that, regardless of the rate, revenue per customer in these two cities remains about the same.

Looking at the Appendix under Northwestern it will be noted that the rate has steadily declined from 1929 to 1939 on the average, down to 24.7. Revenues have varied from, I think, $112.00 odd down to less than $80.00. In the Calgary Company the rate has varied over the years not very much from 1929 to 1939 but decreasing subsequently. But in all cases less than the Edmonton rate. Consumption has varied from 103 down to 85. But it is interesting to note that the revenues of the two companies are substantially the same.

(b) Shown below is a tabulation of annual revenue per domestic customer in the Canadian Western System for the years 1935 to 1944 inclusive. These figures have been corrected to normal temperature and in the years since 1939, the 8% sales tax has been included.

1935	$66.20	1940	$62.10
1936	66.00	1941	63.70
1937	65.00	1942	65.80
1938	65.10	1943	66.40
1939	64.20	1944	65.70

It will be noted that the rate reduction late in 1939 resulted in a decrease in revenue for 1940. By 1943, however, this decrease had been wiped out by increased consumption. The effect of the 1943 rate reduction was barely noticeable in 1944 revenues.

The years following 1939 were admittedly abnormal and subject to unusual wartime influences, which cannot be evaluated. It is generally recognized, however, that adjustment in customer usage following a rate decrease takes place over five or more years. The customer does not immediately make a conscious effort to raise his annual expenditure to the former figure. He does so unconsciously over a period of years and the effect noted here might have occurred in any case over a number of years without the wartime influences, subject of course, to any long range trend in the direction of lower consumption for other reasons.

The effect of a rate increase, on the other hand, would be immediate. Rate increases are always well publicized and the customer would immediately take steps to offset the increase.

It should be pointed out that while it is generally true that consumers tend to adjust their consumption

up or down to fit the expenditure to which they are accustomed, this does not mean that overall revenues tend to remain fixed regardless of rate variations. Under certain circumstances, a company operating in an unsaturated market might increase its gross revenue materially by means of a rate reduction. This is because the rate reduction not only increases consumption per customer, but may also bring in new customers. In a saturated market, of course, the latter factor would not apply. Similarly, in the case of a rate increase, gross revenue might decline if the rate change results not only in decreased usage per customer, but also in loss of customers.

(Go to Page 5095)

IMPERIAL OIL REFINERY

As a working figure 1,800,000 MCF has been used as the future annual requirement of the Imperial Oil Refinery. The following tabulation shows consumption for past years in MCF.

	1936 - 1,026,543	1941 - 972,683
1937	1937 - 1,094,270	1942 - 761,716
	1938 - 1,358,684	1943 - 1,596,224
	1939 - 1,265,964	1944 - 1,904,165
	1940 - 1,019,794	

It is noted that consumption declined steadily from 1938 to 1942, rising sharply in 1943 and 1944.

Two other facts are cited -

1. "Under the jurisdiction of the government-owned Allied War Supplies Corporation, an akylate plant was begun in Calgary in 1942, and went into operation in April 1943." - quotation from "The Industrial Front", Department of Munitions and Supply, January 1, 1944.

2. Deliveries of fuel oil to the railroads in Alberta and Northwest Territories have increased enormously during the war as evidenced by the following figures from bulletins of the Dominion Bureau of Statistics.

It is in Imperial gallons and rising from seven million odd in 1938 to over thirty million in 1943.

Fuel oil is directly competitive with natural gas at present rates to the Imperial Oil Refinery at about 75 cents per barrel.

Whether or not the future demands of the Imperial Oil Refinery will be as much as the 1,800,000 MCF working figure

mentioned above will depend on -

(a) the natural gas requirements of the future processes and products of the Refinery. This will be related, not only to the total heat requirements of the particular process in use, but also to the amount of by-product gas made available to fuel by the refinery operations themselves.

(b) the extent to which oil may be available to compete with natural gas as refinery fuel. This could be important at present gas rates if the supply of fuel oil in the future exceeds the demand. This, in turn, is related to the gravity of the crude oil delivered to the refinery and to the demand for fuel oil, notably on the part of the railroads. If the gas rate to the refinery rises, the possibility of severe fuel oil competition will be increased.

There are enough doubtful elements in this situation to suggest that the estimated future consumption of the Imperial Oil Refinery, as referred to here, is so high as to be unsafe even at present rates, and to suggest that the present rate is about as high as it can go if this load is to be retained.

SUMMARY

1. Customers have ample opportunity to reduce consumption given the proper incentive.

2. Any rate increase will give customers the motive for reducing consumption to avoid an increase in cost.

3. Experience shows that customers do make every effort to limit their utilitiy expenditures to the amount to which they are accustomed and which they can afford to pay.

4. Coal is closely competitive with gas in many instances, even at present rates.

5. It is unsafe to assume that the Imperial Oil Refinery's present consumption will continue even at present rates and more unsafe still at any increased rate.

6. Any gas rate increase will have a cyclic effect of decreased consumption, further rate increases and so on. This process would not have to advance far before coal becomes actively competitive over a wide range of consumers.

THE CHAIRMAN: Do you want these Appendixes read into the record, Mr.Steer?

MR. STEER: Oh yes, they should be, Sir. I doubt if it necessary to read them unless somebody wants to read them, if the reporter will simply copy them in.

THE CHAIRMAN: Are you all satisfied with that?

MR. FENERTY: Yes.

MR. CHAMBERS: Yes.

MR.BLANCHARD: Oh yes.

MR. McDONALD: Yes.

THE CHAIRMAN: All right, Mr. Howard, if you will have them copied in.

APPENDIX 1

QUOTATION FROM NATIONAL RESEARCH COUNCIL OF CANADA BULLETIN #693 "HOUSE INSULATION" by C. A. MacCONKEY

Advantages of Insulation

Saving in Fuel

As indicating the probable fuel saving that would be obtained in a typical two-storey house with unfloored attic space, the data presented by C. G. Segeler[1] may be quoted. These values, which were averages obtained from an analysis of 200 homes, showed that the proportions of total heat loss from the various parts of the house were as follows: 16.2 per cent through the roof; 27.0 per cent through the walls; 25.8 per cent through the glass; 24.6 per cent by infiltration; 4.3 per cent through the door; and 2.1 per cent through other sources, including the floor. The calculated reductions in heat loss, and therefore the theoretical fuel saving that might be expected were:

1 in. insulation in sidewall	12.8 per cent
2 in. insulation in sidewall	17.4 " "
3 in. insulation in sidewall	19.7 " "
3-5/8 in. insulation in sidewall	20.3 " "
1 in. insulation in ceiling	11.3 " "
2 in. insulation in ceiling	13.3 " "
3 in. insulation in ceiling	14.1 " "
3-5/8 in. insulation in ceiling	14.5 " "

[1] Quoted by Konso, S. Factors affecting fuel saving. Univ. of Illinois Eng. expt. Sta. Circ. 26:100-117,1936. The University, Urbana, Ill., U.S.A. (50¢).

F.A.Brownic,
Dir.Exam. by Mr.Stoor.

3-5/8 in. insulation in walls and ceiling	34.8 per cent.
Weather stripping on all windows	9.8 " "
Storm windows and doors all over	31.3 " "
3-5/8 in. insulation in walls and ceiling and storm windows and doors.	66.1 " "

Reduction in Size of Furnace and Heating Plant Required

It is obvious that if less heat is lost, it should be possible to use a smaller furnace and smaller coils.

Increase in Comfort.

A well-insulated house is less affected by changes in the outside temperature and, as a consequence, the temperatures inside the house are subject to less variation. Infiltration, draughts and temperature gradients in rooms are lessened. In winter a person is generally more comfortable in a room with warm walls and cool air, than when the air is warm and the walls cool. Insulation, by keeping the inside surface of the wall warm, tends to promote comfort conditions.

In summer, insulation, especially of the roof, prevents the penetration of much of the heat from the outside to the inside, and so keeps the house cooler.

.....

F.A.Brownie,
Dir.Exam. by Mr.Steer

APPENDIX 2

EXPERIENCE WITH INSULATION IN CALGARY HOMES

Case 1.

Bungalow - ceiling only insulated with Mosstex late in 1936.

Annual Gas Consumption

- Average of 3 years immediately before insulation - 287 MCF
- Average of 8 years immediately following insulation - - 245 MCF

Annual saving = 42 MCF or 14.6%.

Annual degree days

- Average 1934 - 36 = 8780
- Average 1937 - 44 = 8670

Decrease in heat requirements latter period over former = 1.4%

Note:- Since annual consumptions shown above include cooking, water heating, refrigeration and garage heating the saving in gas used for house heating only would be around 25%.

Case 2.

Bungalow - ceiling insulated with Mosstex January 27th, 1939.

Annual gas consumption

- Average of 5 years immediately before insulation - 291 MCF
- Average of 6 years immediately following insulation - 237 MCF

Annual saving 54 MCF or 18.6%.

Annual degree days

- Average 1934 - 38 = 8912
- Average 1939 - 44 = 8578

Decrease in heat requirements latter period over former = 3.8

Note:- Same as Case 1.

.....

APPENDIX 3

QUOTATIONS FROM PRESS RELEASE OF AUGUST 16th, 1944, by ANTHRACITE INDUSTRIES INC., 101 PARK AVE. NEW YORK

NEW PRINCIPLE OF BURNING ANTHRACITE PROMISES MORE EFFICIENT AND ECONOMICAL POST-WAR HEAT

PRIMOS, Pa., Aug. 16, 1944 - Realization of the dream engineers have had for many years of an economical, completely automatic, highly compact anthracite heating unit was envisioned today, when a revolutionary new principle of burning anthracite was demonstrated to home heating equipment manufacturers at the Anthracite Industries laboratory here.

.....

Utilization of the new principle will make it possible, according to Frank W.Earnest, Jr., president of Anthracite Industries, Inc., for manufacturers to produce in the early post-war period an automatic unit, suitable for heating the average size home, that can be enclosed in a space less than 2 by 2 by 3 feet. This unit, he stated, can be sold and

installed for considerably less than equipment now in use for any type of domestic fuel.

.....

Equally effective with either hot water, steam or warm air systems, the mechanism for applying the new principle is eimplicity itself. It consists of a hollow tube six or eight inches in diameter and approximately 18 inches long. The anthracite is fed into the tube automatically; the coal burns in the centre of the tube, and the ash is discharged at the other end. Water or air, circulated around the hot part of the tube in a small, compact jacket, carries the heat throughout the house in the same manner in which it is distributed by present day heating systems.

.....

"Heretofore practically all heaters were designed with large grate areas with extensive conbustion space above the fire bed so that the large quantities of carbon monoxide which were formed could be burned above the bed with secondary air. As a result, this equipment contained several times the bulk and weight that is necessary in a furnace especially designed to take advantage of anthracite's particular combustion requirements. The complete absence of complicated flue passes or secondary heat absorbing surfaces in this new method of burning does not lower efficiency, because the heated products of combustion flow through the cold incoming coal to stimulate ignition and to use the coal as an economizer, replacing conventional secondary heating surfaces.

The efficiency is further heightened by the fact that the coal cannot clinker. Despite the high rate of burning, it is not possible for clinkers to form, because

the small size of the fire bed permits the water surrounding the tube to carry off the heat so rapidly that the actual temperature of the burning coal is lower than the point at which clinkers form in an anthracite fire.

As the development thus represents a principle of combustion rather than of equipment design, the flexibility of application is unlimited. This principle may be employed in the design of equipment for large or small homes, central heating units or space heaters, hand-fired or fully automatic furnaces. Regardless of the forms which the various applications take, however, they will have the universal advantages of extreme simplicity, high efficiency and unprecedented compactness.

In adaptation to fully automatic equipment, the anthracite is fed into the tube by a conveyor leading directly from the coal supply. The ash is discharged into enclosed dust-proof containers, which would need to be replaced only two or three times a week, or directly into pits prepared for the purpose outside the basement. The amount of heat desired is regulated automatically by thermostatic control.

APPENDIX 3A

QUOTATIONS FROM "PERFORMANCE CHARACTERISTICS OF A DOWNDRAFT COKING FURNACE" BY PROF. J. R. FELLOWS, UNIVERSITY OF ILLINOIS

"If efficient and smokeless combustion is to be achieved in a hand-fired furnace burning a high volatile fuel, the design of the furnace must include provision for the complete combustion of all of the hydrocarbon gases which make up that portion of the fuel which is known as volatile matter. The requirements for complete conbustion of the volatile matter found in high volatile fuels may be simply stated as follows:

1. The rate at which the volatile matter is converted to a gaseous state must be controlled.

2. Sufficient secondary or overfire air for the complete combustion of the hydrocarbon gases contained in the volatile matter must be supplied at all times.

3. Secondary air must be thoroughly mixed with the gases.

4. The mixture of gas and air must be heated to a temperature which will insure its ignition. Experiments by J. W. McDavid have indicated that when coal gas-air mixtures are heated by the sudden application of a hot body, a temperature of at least 1500 F. is required to insure their instantaneous ignition.

Conventional updraft furnaces of all types are provided with a grate, a fire pot, and a combustion chamber, arranged one above the other in the order named. The only convenient method of adding fresh fuel is to pile it on top of the hot coals. When the fresh fuel is placed on top of the coals, it comes between them and the heating surface

of the furnace with the result that the heat output of the furnace is temporarily decreased. Since a relatively low temperature is required to convert the volatile matter in the coal to the gaseous state the gases contained in each charge of fresh coal are liberated very rapidly. It has been found impracticable to supply sufficient secondary air to completely burn the gases from a new charge of coal during the period that follows the firing of the furnace, and as a result a large portion of the gases usually passes out of the chimney unburned. Even if provision were made for the introduction of sufficient secondary air in the coking period at the beginning of the cycle, much of the gas would still be wasted because of no provision for ignition of the gas-air mixture."

.....

"After making a thorough study of the burning characteristics of high volatile bituminous coal, J.C. Miles, and the author, members of the mechanical engineering department at the Univesity of Illinois, have perfected and patented a design principle which we hage chosen to call the downdraft coking principle. When applied in the design of a hand-fired furnace of any type, the unit produced will be capable of burning high volatile bituminous coal both efficiently and smokelessly."

.....

"The procedure used in adding fresh fuel is:

(1) Shake the rocking grate at the rear of the furnace to remove a part of the accumulated ash; (2) push the hot coals from the previous charge along the sloping floor of the coking chamber onto the sloping pinhole

grate; and (3) pour the fresh coal into the coking chamber from a scuttle. The only tool required is a conventional poker and the technique is as simple as pulling back the covers before getting into bed. The baffle wall at the rear edge of the coking chamber prevents covering the hot coals with the fresh coal. The baffle wall also directs the gases as they are released in the coking process over the surface of the incandescent coke. The primary under-grate air enters the ash pit through a port in the ash-removal door and passes upward through the grate and the bed of hot coals as in the conventional furnace but the products of combustion from the coke bed do <u>not</u> pass through the fresh coal. The primary coking-chamber air enters the furnace through a port in the firing door and supports a low combustion rate in the coking chamber which liberates heat that gradually converts the volatile matter in the fresh coal to the gaseous state. The secondary air enters the furnace through ports above the firing door, is conducted through a horizontal passage over the coking chamber, and then through vertical passages in the baffle wall. The secondary air emerges from the bottom of the baffle wall to mix thoroughly with the hydrocarbon gases emanating from the coking chamber and any carbon monoxide gas from the coke bed. The gas-air mixture is ignited by the incandescent surface of the hot coke and is burned in the small refractory-lined combustion chamber back of the baffle wall. An auxiliary combustion chamber is provided in the upper portion of the furnace to insure complete combustion at higher rates of burning. From the auxiliary combustion chamber products of combustion pass through a radiator to the breeching and chimney.

It is the intention in the design of the downdraft coking furnace that all three ports would be adjusted at the factory or by the dealer for the type of fuel that would be the logical choice in the customer's locality. (One adjustment has been found to be satisfactory for all types of high volatile bituminous coal). The householder would neither adjust nor operate any dampers except the cross damper in the smoke pipe with which he would control the effective draft at the smoke collar. The smoke pipe or breeching should preferably be equipped with a barometric draft regulator located between the cross damper and the entrance of the smoke pipe to the chimney, to provide a constant draft for the operation of the furnace and to eliminate the possibility of the furnace overheating. The furnace can be satisfactorily controlled with a conventional check damper, but better efficiency can be achieved at low rates of burning by using a cross-damper capable of reducing the effective draft at the smoke collar to an amount as low as 0.001 inch of water.

The unit was designed to occupy a minimum of floor space by placing a part of the combustion space above the secondary air passage instead of using one large chamber as in the original experimental model."

.....

"In addition to burning the fixed carbon of the coal more efficiently the downdraft coking furnace burned practically all of the volatile matter in the fuel, whereas it has been estimated that unburned gases account for around 20 per cent of the heating value of high volatile fuels when they are fired in the conventional manner in conventional hand-fired furnaces."

"Tests at a maximum burning rate, at a minimum burning rate, and under conditions of night banking, indicate that the downdraft coking furnace is capable of burning high volatile bituminous coal smokelessly under all of the unfavourable operating conditions that it would be called upon to meet in heating a home throughout a heating season. In tests at intermediate rates of burning, the furnace gave smokeless combustion, good efficiency, and uniform heat release for as long as 12 hours on one charge of fuel. The furnace will operate for as long as 24 hours on one charge of fuel when the demand for heat is low.

Analyses of flue-gas samples taken for many different operating conditions indicate that high volatile fuels can be burned in the downdraft coking furnace with good efficiency over a wide range of combustion rates. No special skill is required for the successful operation of the furnace, and no adjustment of the air-inlet ports is necessary in varying the combustion rate from a minimun to a maximum. The only means of regulation required is a simple cross damper in the breeching; the fire responds instantly to a change in the damper setting and will maintain a uniform heat output at the desired rate for any fixed damper setting. The furnace would respond perfectly to thermostatically operated dampers and there would be no danger of explosions from checking the fire after firing fresh coal.

The downdraft coking principle is applicable to all tupes of hand-fired heating equipment such as boilers, heating stoves, cooking stoves, and water heaters, in addition to warm-air furnaces. Experiments with a baffle

wall constructed entirely of firebrick indicate that this principle can be applied to hand-fired furnaces without using any expensive alloy metal in the construction. Application of the principle to all types of hand-fired heating devices would practically eliminate smoke and soot and save many millions of tons of fuel every year."

.....

APPENDIX 4

EQUIVALENT COST OF DRUMHELLER COAL AT VARIOUS GAS RATES

Assuming - Gas at 1000 B.T.U. per cu.ft. and 75% efficiency

Coal at 9870 B.T.U. per pound and 65% efficiency

17.1 MCF gas = 1 ton of coal

Annual Gas Consumption MCF	Equivalent Tons of Coal	Equivalent Cost of Coal per Ton				
		Present gas rates	Present + 2¢	Present + 4¢	Present + 6¢	Present + 8¢
1000	59	$ 4.34	4.67	5.02	5.36	5.70
5000	292	4.30	4.64	4.99	5.33	5.67
10,000	585	4.30	4.64	4.98	5.32	5.67
12,000	702	4.10	4.44	4.78	5.13	5.47
15,000	877	3.90	4.24	4.59	4.83	5.27
20,000	1170	3.70	4.04	4.38	4.72	5.06
30,000	1750	3.39	3.74	4.08	4.42	4.76
300,000	17,500	2.14	2.48	2.83	3.17	3.51

Note: The 8% Sales Tax is not taken into account in the above figures. If it were included it would have the effect of raising all the equivalent coal prices by 8%. This would be the case in all buildings subject to this tax, which includes all apartment houses. As an example, inclusion of the tax in the first line above would alter it as below:

1000	59	$4.69	5.05	5.42	5.79	6.15

APPENDIX 5

Graph issued by the Bonneville Power Administration, May 1944, "Pacific North West Opportunities", showing Power and Natural Gas Resources Utilization, Domestic and Commercial Power Development, Urban Power Utilization, and 1943 residential electric service.

APPENDIX 6

Gas Rate Data - Massachusetts, showing Annual Consumption of Gas per customer in one of 52 Massachusetts towns, together with the average rate in that town. - The necessary consumption at various rates to yield an annual revenue of $26.00. - A similar curve for an annual revenue of $36.00.

H-2-18

F.A.Brownie,
Dir.Exam.by Mr.Steer.

APPENDIX 7

ACTUAL REVENUE PER CUSTOMER
AND AVERAGE NET RATE

	Northwestern		Canadian Western	
	Average Rate per MCF Cents	Average Rate per Customer Dollars	Average Rate per MCF Cents	Average Rev. per Customer Dollars
1929	39.0	112.02	29.58	103.08
1930	38.0	108.66	29.90	99.89
1931	35.8	91.97	30.06	89.47
1932	35.6	100.73	30.60	99.13
1933	35.1	91.50	30.70	95.00
1934	33.9	79.76	30.64	85.13
1935	32.7	91.78	30.65	97.23
1936	32.0	91.65	30.65	97.23
1937	31.4	91.95	30.65	97.85
1938	31.2	89.97	30.78	90.27
1939	31.5	91.77	30.49	88.37
1940	29.5	92.45	27.32	86.44
1941	26.6	89.52	26.38	87.42
1942	25.8	96.69	25.43	98.49
1943	25.0	108.49	24.87	101.76
1944	24.7	107.49	23.94	95.86

Note 1:- Figures do not include 8% Sales Tax.

Note 2:- Average Annual temperature

Edmonton - 37.0

Calgary - 38.5

CROSS-EXAMINATION BY MR. CHAMBERS

Q Mr. Brownie, I suggest to you that one of the purposes of public utility regulation, as well as one of the objects of a public utility company, which supplies us with water, gas or electricity, is to make those services of the commodity available in any desired quantity to the various members of the public in the area that it serves. Would you agree with that proposition?

A Yes.

Q And, of course, another object of regulation of those companies is that this service of commodities may be available to the parties desiring them, at reasonable costs. Do you agree with that?

A Yes, consistent with certain other factors.

Q What other factors? Well probably I will come to that. Now, while such service is immediately available from the utility company, it cannot, I suggest, by the very nature of the product or the service supplied, ordinarily be stored by the customer himself?

A That is correct.

Q And that is one of the matters that is of important consideration in dealing with the question of whether a customer would change from gas to coal, would it not? If he is using coal, he has to supply a certain amount of storage facility?

A Yes, that is a consideration.

Q Whereas if he is using gas the utility company assumes the storage obligation?

A That is right.

Q And, as I understand it, that a utility company which is giving good service to a community must be prepared instantly for, I am taking that in a general sense, to furnish any

amount of service which any customer may demand for either normal or emergency use, would that be a fair statement?

A Yes, unless the contract between the customer and the company specifies otherwise.

Q Yes. But, speaking generally, the utility company itself has no control over the requirements of its various customers. Would you agree with that?

A You mean the peak requirements or the annual sales?

Q Well, I would say the annual sales, for instance, we will take that first?

A Well the company can, by aggressive sales increase its annual sales. And the company by bad operation and high cost could decrease its annual sales.

Q But the company may by advertisement or other practice encourage people to desire and want to use the gas?

A Yes.

Q But, what I am getting at is, the quantities that any customer wants is not within the control of the utility company?

A Yes, generally that is correct.

Q And those requirements of the customer as to the quantity and the rate of consumption, I suggest to you are ordinarily based on, or detected by various things, and one of them is or would be the customer's own business, its type and nature, and the amount of the sales of his business?

A Yes, that is correct.

Q That would be one thing?

A In some cases, yes.

Q Yes. Then when we come to the domestic, it is probably governed to a certain extent by the customer's own personal mode of living, and his scale of living?

A That is correct.

Q And the size of his family, the size of his house, and things of that nature?

A Yes.

Q Now I suggest to you, Mr. Brownie, that the effect of these matters that we have been discussing is to make these characteristics of utility service, and I am talking now with respect to gas, water and electricity, is to accumulate very high demands at certain periods as compared with others, is that a fair statement?

A Yes.

Q And the requirements of the service to the consumers must, and I am speaking generally , constantly and instantly be available, means a large investment by the utility in facilities to effect that end?

A That is right.

Q And have you ever heard or read criticisms or something to this effect that the capital charges of utility companies are unduly large in comparison with the revenues? Have you ever run into that?

A I do not know that I have heard of it as a criticism, It is quite commonly known as a characteristic of utility companies.

Q Yes. But in any case I suggest to you, Mr. Brownie, that that relatively high investment in public utility properties in proportion to their revenues is due in a large measure to the requirement that is made upon the utility to supply, first of all, instantaneous service; that would be one factor, wouldn't it?

A Yes, that would be one factor.

Q And, secondly, continuity of service; wouldn't that be a factor?

A Yes.

Q And, thirdly, this fluctuating demand for the service or the rate of service?

A Yes, those are all factors.

Q And those affect the utility's investment?

A Yes.

Q And I suggest to you that because of this high investment which is entailed by this thing, there is another factor which is of major importance when we are talking of utility charges, and that is diversity of the load or the demand for the service?

A Important in what way, Mr.Chambers? I do not just follow what you are getting at.

Q When you come to decide upon the amount of charges that the utility is to make for any particular service?

A Diversity of demand has a very important effect on peak loads.

Q Well, I will probably come to that in a minute, and elaborate on what is in my mind. Well, now, for those reasons that we have been discussing, is it not true that a large proportion of the cost of service to a customer is independent of the particular number of units of service that he takes?

A Yes.

Q Now I suggest to you, Mr. Brownie, that any system of rates or charges to be made by the utility companies that ignores that fact that I have just talked to you about, cannot be consistent with costs, what would you say as to that?

A I think that is self-evident, Mr.Chambers.

Q Yes. And if that fact is ignored in fixing a system of charges for the utility, the result would be that certain customers will pay less than cost of their service and the

others will pay more than the cost of the service to them? What do you say as to that?

A I think that would have to follow from what you have said before.

Q And you agree with that proposition?

A Well, yes. What you are saying is, that if your rates are not so set to reflect the cost including fixed charges, then some customers pay more than cost and some pay less?

Q Well, now, you will agree with this proposition, I take it, that the total income or the moneys received by the utility company for the aggregate of all its services, should approximate or be designed to approximate or equal its total costs of rendering its over-all service?

A That is correct.

Q And in that way you would agree that we include capital charges?

A Yes.

Q And by capital charges I mean depreciation, return, and so on?

A Yes.

Q And those costs also consist of wages, maintenance, repairs, and things of that nature?

A That is correct.

Q Now, to the extent that those costs are greater, or increased by reason of any particular service rendered by the utility, the parties for whom that particular service is rendered should, I suggest to you, bear through their rates those increased costs. What do you say as to that?

A That is correct. You may not be able to collect them from them.

Q But that is a sound principle to follow in rate making,

would you say?

A Yes.

Q Now, what would you say as to this, as to the principle of a utility's charges to those various customers being based or allocated on the basis of, first of all, the profits the customer makes in his business which uses the service that the utility supplies to him?

A Generally, I do not think it is a sound basis for such a thing.

Q And I take it you would also agree that it would not be a sound basis to fix the utility's rate for service to any particular customer on the basis of the gross amount of sales of that customer?

A Not in ordinary practice, no.

Q I beg your pardon?

A Not in ordinary practice, no.

Q And you would also agree with this, I take it, that the mere occupation or the nature of the business of the particular customer using the service, should not be the basis in fixing the utility's charges to him?

A Somewhere along that line of thought, Mr.Chambers, under certain circumstances, you might have to have a rate so designed that it would meet competition.

(Go to page 5119)

Q Now would you just illustrate that?

A Beg pardon?

Q What do you suggest in a case of that kind?

A I suggest you would consider whether or not you needed that business even if you took it at less than cost. You might find you were better off to supply that customer at less than cost rather than not supply him at all.

Q And if the utility is supplying him at less than cost, then the other customers are paying for the difference between the cost and what he is being charged.

A That is right, as an alternative to not having that customer's revenue and perhaps increased rates for all other customers.

Q You would also agree, I take it, that the mere use which a customer makes of a commodity or a service supplied to him by the utility should not be the basis of fixing the rates or charges for the service or commodity supplied.

A I would think that is generally correct, yes.

Q Well now, Mr. Brownie, you have heard of this question of discrimination of a Utility Company in its rates. Have you ever run into that?

A Yes.

Q Now I suggest to you, and I am asking you whether you agree with me, that the discrimination in utility charges may arise under these circumstances. First of all that if two customers are charged different prices for what is essentially the same service, that would be discrimination would it not?

A Yes.

Q And it might also arise that if two customers pay similar prices for essentially different services, would that not

be so?

A Well that might or might not, Mr. Chambers.

Q Well now, would you explain that?

A Well in fact it does not mean that they are necessarily different values. They might be different in other ways.

Q What I meant was essentially different services and implying too that they are services that had different costs, that had different attributes. I am talking about the difference so far as the Public Utility company is concerned and the impact on it.

A You mean two customers that are paying the same rate, one for what might be called inferior service and the other for a superior service?

Q Yes.

A Yes, that would be discrimination.

Q I suggest this follows as a corollary to the first two that discrimination would also arise if differences in prices between two classes of service are greater or less than the significant differences in conditions surrounding the service. Do you follow?

A Yes, I follow you. I think that would be correct.

Q Then I suggest to you this, Mr. Brownie, that it is desirable in the interests of equity and fairness as between various customers or users of the utility to analyze the utility's costs in such a way as to reveal as accurately as possible the costs imposed upon a utility company by each class of service to each class of customer. Would you agree with that as a sound proposition?

A Yes.

Q And that for the purposes of this kind of an analysis,

the utility company's costs usually fall into three classes. First of all we have their costs which are associated with the readiness of the utility company to render the service and we refer to those as Demand Costs. Is that correct?

A That is correct.

Q Then there are another type of costs that are proportional to the type or volume of service which the customer takes. That is right is it not?

A That is correct.

Q You call those Commodity Costs?

A Yes.

Q Or Output Costs. Then there is another kind or class of costs of a utility company, those which are relatively uniform per customer, irrespective of the amount of service that he takes. That is so is it not?

A That is correct.

Q We refer to those usually in utility parlance as Customer Costs?

A Yes.

Q Now would you agree with this proposition, Mr. Brownie, the purpose for which - and I think you in effect told me this but I want to make it clear - the purpose for which service is taken is immaterial in fixing rates except so far as the supplier is affected by the amount taken and the circumstances under which it is taken.

A That is correct.

Q And that so far as the public utility company is concerned the ideal and perfect customer would be

one whose maximum demand on the utility was also his minimum demand. Is that right?

A Yes.

Q In other words, the ideal utility . . . .

A Mr. Chambers . . . .

Q Pardon me?

A The ideal customer might be one whose demand could be so adjusted that it occurred when it did not interfere with anybody else using the utility service. That would be what you might call an interruptible customer. I think that would be preferable to the other.

Q Is it not so that the utility company is looking for, ordinarily, a customer who has an even load?

A That is correct, yes.

Q And when I talk about an even load, it is one that is an even load every hour of the day throughout the 365 days of the year.

A That is correct, yes.

Q Now, Mr. Brownie, would you tell us your understanding of what is or how you compute a customer's load factor?

A You divide the customer's average load over a year by the customer's peak load and usually in the gas business it is taken as a daily peak and you get a factor which is always unity or less.

Q Would this be the same thing in other words, load factor is the proportion which a number of units of service actually taken by or sold to the customer during the year bears to the number of units which would have been taken by him if a maximum demand had remained constant throughout the year?

A Yes that is the same thing.

Q Now I think you have told me that the utility plant and equipment, if it is to render adequate service to its customers must be capable of meeting the maximum demand upon it at any moment over the 24 hour day of the entire year, subject of course to any special happenings.

A That is correct.

Q I therefore take it and I am asking your view on it that the less the demands made by the different customers synchronize and the more evenly the aggregate demand of the customers is spread over the 24 hours or over the whole year, the smaller the size of the plant and equipment that the utility will require to maintain to meet the maximum demand. That follows does it not?

A That is correct, yes.

Q Now can you tell us this, and give us an explanation of this term. What is meant by the term "Diversity Factor" as used in compiling rate schedules or as talked about in these utility matters?

A It is simply lack of concurrence of peak demands of different customers.

Q Would this be the same thing, it is the proportion which the sum of the customers' maximum loads bears to the load actually carried by the utility.

A That would be one way of defining it.

Q And that proportion or that Diversity Factor depends upon whether also the demands of the customers are co-incident?

A That is correct.

Q And the less the customers' or consumers' demands coincide the better for the utility which is catering to those

demands so far as costs are concerned.

A That is correct, yes.

Q Now, Mr. Brownie, would you agree with this proposition that it is essential to bear in mind the effect of the load factor and the diversity facotr on the working of an electric undertaking, when considering the scale of charges?

A By the scale of charges do you mean in setting a rate schedule?

Q Yes.

A Yes, you would give weight to individual customer's load factors or the load factor of groups of customers, in setting the rate schedule. You might give a more favorable rate to a group of customers who had a better load factor than to another group. As to diversity, I never thought of diversity being considered in that way. I suppose perhaps it could be, and perhaps it is unconsciously.

Q Do you not think diversity would affect it too? That is the very point I think you mentioned. Here is what you have in mind. You mention that if a customer arranges that his demand on the utility is only going to be at times when there is no other demand, is that not part of the Diversity Factor?

A Yes. If it is off-peak in a sense it would be more favorably disposed.

Q If you have one who takes his demands off-peak, is that not another Diversity Factor?

A Yes.

Q Then you would agree with that statement I put to you.

A Yes.

Q I mentioned there an electric undertaking, but the same

would apply to a gas undertaking?

A Yes, that is right.

Q Such as we are talking about here. Now turning to Exhibit 137, Mr. Brownie.

THE CHAIRMAN: By the way, it has not yet been marked as an exhibit.

MR. CHAMBERS: Exhibit 137.

FUTURE MARKET AS RELATED TO GAS RATE, AUGUST 1945, SUBMISSION PREPARED BY THE CANADIAN WESTERN NATURAL GAS, LIGHT, HEAT & POWER COMPANY LIMITED IS NOW MARKED EXHIBIT 137.

Q On page 2, Mr. Brownie, you discuss the matter of insulation and your observations there, I take it, with respect to insulation retaining heat in a house, would apply equally to heat that is generated from coal as well as from gas?

A Yes.

Q Now, Mr. Brownie, have you got by any chance with you the total Calgary sales of your company for say the years 1926 down to the present?

MR. STEER: What is that?

MR. CHAMBERS: The total sales of your Calgary system from 1926 down.

A You mean by years?

Q Yes. Just the total by years.

A Yes, I have them here, Mr. Chambers.

Q Shall we have them read into the record or I could have them copied.

THE CHAIRMAN: We can read them in, I think.

MR. CHAMBERS: By the way perhaps I should put this question, can you tell me, Mr. Brownie, the year when your company commenced to take its entire Calgary requirements

from the Turner Valley area? 1926?

A I cannot be sure of that.

Q Was it between 1926 and 1929, do you know?

A Yes, it was around there. I am not certain of the exact year. That is one of the things I can never remember.

Q By the way, are these figures adjusted for degree days?

A No, these are actual.

Q All right.

A Do you want me to read all these figures from 1926 on?

Q Yes, if you please.

A

1926	-	2,986,730 MCF
1927	-	4,668,896 MCF
1928	-	5,102,775 MCF
1929	-	6,613,579 MCF
1930	-	6,966,778 MCF
1931	-	6,494,917 MCF
1932	-	7,029,831 MCF
1933	-	6,694,855 MCF
1934	-	6,294,040 MCF
1935	-	7,233,271 MCF
1936	-	7,371,254 MCF
1937	-	7,460,347 MCF
1938	-	6,905,844 MCF
1939	-	6,966,798 MCF
1940	-	7,712,119 MCF
1941	-	8,289,140 MCF
1942	-	9,981,739 MCF
1943	-	10,828,386 MCF
1944	-	10,899,081 MCF

Q You have not 1945?

A No, I have not 1945. It must be available now but it was not available when I made this statement. It is probably available now. This does not include, incidentally, the Imperial Oil Refinery or the Ammonia Plant.

Q Have you readily available or is there such a thing something that will show the degree day or days that enter into the computation?

A Yes.

Q Have you a compilation of that?

A I have a statement I prepared for Mr. McDonald. I have forgotten how far back it does.

MR. CHAMBERS: Have you that, Mr. McDonald?

MR. McDONALD: Yes. (Statement produced hy Mr. McDonald.)

WITNESS: These annual degree days back to 1929.

MR. CHAMBERS: May I mark that?

MR. McDONALD: That is the only one I have but you can mark it and I will get another.

Q MR. CHAMBERS: Is that a copy of it?

A Yes.

Q For the years 1929 to 1944?

A Yes.

MR. CHAMBERS: I would like to tender that as an exhibit.

THE CHAIRMAN: It will be Exhibit 138. What do you call it, Mr. Chambers?

MR. CHAMBERS: It is, as I understand it, these figures which Mr. Brownie read into the record adjusted to degree days, to make it comparable.

WITNESS: No, those are simply the degree days, Mr. Chambers.

Q MR. CHAMBERS: Those are the degree days?

A Yes.

Q And from these you can compute, can you, or anybody can compute . . . . .

A Yes, you could, well I do not know whether you have anough information there.

THE CHAIRMAN: Compute what, Mr. Chambers.

Q MR. CHAMBERS: Compute what the consumption would have been on the basis of the same temperature throughout each of the years.

A You mean computed from that without having other information?

Q Yes.

A No, you could not compute it from that without having other information.

MR. CHAMBERS: Then I do not think I had better clutter the record up with this unless I know what the rest will be.

MR. HARVIE: For what years, is that over a period of years?

MR. CHAMBERS: 1929 to 1944.

Q MR. CHAMBERS: Well would you tell us, Mr. Brownie, what information one would require in order to adjust these annual consumptions which you have read into the records, to make them comparable as regards temperatures throughout the year?

A Well a very rough correction could be made by knowing the sales in the month of August for each year and after multiplying that by 12, subtract the result from the total sales, and correct the remaining figure to some date, some normal condition, on the basis of the degree days in any year and then adding back on 12 times August.

Q I take it that your company, throughout the year, makes such computations does it not?

A Yes.

Q Could you make that available for us, Mr. Brownie, from 1926 to 1945?

A Yes.

MR. CHAMBERS: Well in view of that, sir, I do not think I will bother filing this other document.

Q MR. CHAMBERS: You will get those for us, Mr. Brownie?

A Yes.

MR. CHAMBERS: And if the other parties are agreed, I would like to have Mr. Brownie make it available and then just file it as an exhibit.

MR. HARVIE: You are not marking this one as an Exhibit now?

MR. CHAMBERS: No.

Q MR. CHAMBERS: Now I would just like to talk to you a moment about this matter of saturation; would you agree with this statement that your company has an exceptionally high percentage of the available business in Calgary?

A Yes.

Q And I think you told us once before that the domestic, according to the Dominion statistics, - was around 92%.

A Something like that.

Q And have you any estimate or composite estimate made as to the percentage of all the available business in Calgary that your Company has?

A No, I have not, Mr. Chambers.

Q No.

A That is something, I have heard a lot about it since this inquiry started but it is not a particularly important thing to us.

Q Well so far as the domestic consumption is concerned, I

suggest to you that the greater part or portion of the business which you have/got is represented by houses and dwellings that are not, - that are on streets or places that are not served by your gas mains.

A Yes, I would think that is correct.

Q And is it not a fact that the dwellings and houses that are located on streets or lanes served by your company are practically all connected to your system?

A Practically all. There are some that are not.

Q Would you agree, - you have lived in Calgary how long?

A Oh about 30 years, off and on.

Q And you have been with the Gas Company for many years, how many years?

A Well this Company and the Edmonton Company for 10 years.

Q Yes. Would it be fair to say that there were no house building booms in Calgary between 1930 and 1939?

A I am not just sure, Mr. Chambers. I know that a tremendous area on the North Hill was built up somewhere, - it may have been before that period or it may have been in the early part of that period. I am not just sure when Rosedale was all built up.

Q And would you agree with this statement, that the coal operators in Alberta and in the Southern half of Alberta have been trying for markets from as far back at least as 1926 up to the present time?

A Yes, I will agree with that the way you put it.

Q In other words, well, they were looking and seeking and fighting for markets prior to 1930, were they not?

A Well they were trying for them. I do not know whether they did very much on their own behalf to get them, Mr. Chambers.

Q Yes. Now then, on this question of the use of gas or coal for domestic heating, you will agree, Mr. Brownie, I take it, that, aside from the cost of the product, that is the coal or the gas, the customer must pay, - another important influence is this matter of convenience, you will agree with that?

A I would agree with that, Mr. Chambers, but our experience in trying to build up our load in Edmonton certainly indicated in many many instances that the customer was not willing to give too much weight to that factor. I do not say that that would be the case in all instances, but very often it is.

Q Is this not so that, - in the first place there are coal mines contingent to and some of them inside the limits of the City of Edmonton, is there not?

A Yes, that is right.

Q And that Edmonton had no natural gas supply prior to what year?

A 1933.

Q And the initial rate, domestic rate, instituted in Edmonton was considerably higher than those you are talking about here?

A Yes.

Q Do you recall what they were, offhand?

A No, I do not know.

THE CHAIRMAN: 45 cents, were they not?

MR. CHAMBERS: They were at least that.

Q MR. CHAMBERS: And coal, I suggest to you, Mr. Brownie, in those days in Edmonton was even cheaper than it is today?

A Yes.

Q And the situation you had there was, you had custo ers, when you started out, that had never used gas and were coal users and you were changing them to something else, into gas; in other words your move was from coal to gas, was it not?

A We changed them both ways, Mr. Chambers.

Q What do you mean, you changed them both ways.

A Well our interest was in changing them to gas but in one period they were changing very rapidly the other direction.

Q That is having changed over to gas they then went back to coal?

A Yes.

Q When was that?

A I do not remember the year.

Q THE CHAIRMAN: Was that after the main broke and froze everybody up?

A I do not think it was too closely related to that, Mr. Chairman. It was at the beginning of the depression, Mr. Chambers, I do not remember the year but prior to 1934 I would say, the year preceding 1934.

Q MR. CHAMBERS: And at that time what was the gas rate for domestic?

A I do not remember them. I can get them for you, Mr. Chambers. I do not recall them at the moment.

Q But I suggest to you that there would be a somewhat different situation and consequences in Calgary, a city where the people have been, where the domestic people have been not only gas conscious but active users of it for many years; I say that the Edmonton situation would not necessarily be a guide to the situation that would be

found in Calgary, what do you say to that?

A Well that would generally be true, Mr. Chambers, but I think it is also true that those customers who transferred from gas to coal did not do so because they were burning gas only for two years but they did so because they preferred coal for various reasons.

Q Is it not so that in Edmonton the number of the customers of your company have increased considerably in recent years?

A Oh yes.

Q That is new users who have changed from coal over to gas?

A Yes.

Q During what period, or rather since what period has that change been noticeable?

A I think it would be around that same time, 1934, around there but shortly before the war I guess.

Q Yes, during 1934 on.

A Yes, I think that is correct, Mr. Chambers.

Q But you will agree that in addition to the actual out-of-pocket expenses for his heating products, the domestic consumer would also, whether he is in Edmonton or Calgary, would be influenced to a large degree or to a considerable degree by the convenience and the cleanliness and so on.

A Yes.

Q Now then, when we come to the commercial and the industrial user, of course he is influenced by dollars and cents, and aside from the cost, the out-of-pocket cost to him of the heating product, the heating agent, coal and gas, it would be, - one of his incidental costs in the use of coal, I suggest to you, would be the providing by himself of a certain amount of storage facilities, dependent upon the

size of the plant, would that be a fair assumption?

A That is correct but again our experience has been that it is very difficult in selling gas to convince somebody who is now burning coal, that he will get a lot of benefit from this change.

Q Assuming, Mr. Brownie, that you were an engineer, a heating engineer and advisor to an industrial or commercial establishment that was interested in the straight dollars and cents proposition, in considering his cost, would you not advise him to take into consideration this storage matter?

A Yes.

Q And you would also advise him to take into consideration his operating expenses on the heating proposition?

A Yes.

Q And would you not also take this into consideration or think about it, that labor costs throughout the years have increased and still show a tendency to increase, would that not be a fair thing to take into consideration?

A Yes, I think you should take into consideration the possibility of all costs from both sides of the subject going up or coming down.

Q And I suggest to you this, another factor is availability of service, the user burning coal, the industrial user, must take into consideration the possibility that at certain times coal may not be produced and be available and so on.

A Yes.

Q And that that is a situation which would also affect the amount of storage which he must take into consideration.

A That is right.

Q The amount of storage necessary to take care of that

hazard and then the more coal the more capital which he has tied up, is that not right?

A That is correct and it is also correct on the other hand, Mr. Chambers, so that you can see both sides of the picture, that many gas consumers have to take the same thing into consideration.

Q Oh yes.

A They have to, for instance, some customers have to provide oil standbys. They have to put in burners and so on.

Q Have they standbys here now, you see some of them?

A Yes, some have.

Q I mean in order to get the whole picture you have to go into these other features?

A Yes.

Q Now then, the percentages of efficiency; on page 5 of your exhibit 137, is it, in the second paragraph, Mr. Brownie, it says:

> "Drumheller nut can be delivered to the customer's bin in Calgary in small lots for about $6.30 per ton. Assuming efficiencies of 50% for coal, which is commonly accepted for conventional furnaces, and 70% for gas, this would be equivalent to gas at 40.6 cents."

MR. STEER: What page are you reading from?

MR. CHAMBERS: Page 6 and then . . . . .

MR. STEER: I think you said page 5, did you not?

MR. CHAMBERS: I am sorry if I did, it should have been page 6 of Exhibit 137.

Q MR. CHAMBERS: And then the Appendix 4,

at the top you refer to "75% efficiency coal" and "65% efficiency gas".

A The other way around.

Q The other way around, "75% efficiency gas" and "65% efficiency coal"?

A Yes.

Q Now am I right in this, Mr. Brownie, in using these percentages, from enquiries made and from your own knowledge, that you figured that it was fair and proper to use them under the circumstances, what do you say as to that?

A I do not know anything about them from my own knowledge, Mr. Chambers. I did not make any attempt to qualify as a combustion man. I am informed that they are relatively correct. The gas efficiency is, if that be accepted, then the coal efficiency is correct in relation to it.

I am informed also that neither one of them may be correct fundamentally.

Q This is certainly correct, that those figures might not be correct when applied to any specific plant, I mean to customer plants.

A That is undoubtedly true. It would only be by accident that any particular plant would fit these figures.

Q But they are considered as representing a fair average efficiency for the prospects in the community, would you say that is right?

A I would say they are considered to represent the fair average relationship between coal and gas.

THE CHAIRMAN: I think we will adjourn now.

(The Hearing was here adjourned, to be resumed at 2 P.M.)

CROSS-EXAMINED BY MR. CHAMBERS:

Q Mr. Brownie, on Pages 8 and 9 of your Report, Exhibit 137, you list certain things, or means by which consumption may be cut down ?

A Yes.

Q Now would you agree with me that those things which you have listed there are not matters which have just come to light in the last year or two ?

A Yes.

Q Those factors have been present throughout the life of your supplying gas to the City have they not ?

A Yes, all except perhaps No. 9 which is a matter of continuel growth.

Q Yes, on Page 10 of the second last paragraph. You are quoting from the Bonneville Publication and that publication is referring there obviously to electricity, is it not ?

A Yes.

Q And you have a quotation from the publication as follows:

"Most consumers are quite sensitive to the size of their monthly power bills, and consciously limit their use of power so as not to exceed monthly power payments to which they are accustomed."

I take it that statement is referable primarily to domestic consumers. Would you agree with that interpretation ?

A Yes, I believe this chart refers to domestic as I remember it, yes.

Q Now I am going to suggest this to you more for the purposes of discussion that that idea or that principle is probably applicable to a greater extent with the use of electricity

for domestic purposes than gas for domestic purposes. What do you say to that ?

A I think it might be to a greater extent in the case of electricity than gas.

Q And I had in mind that primarily electricity is used in the home for lighting. That is the first thing ?

A Yes.

Q And in some cases cooking and that on the other hand gas is used when it is used in a domestic establishment, it is used first of all for cooking ?

A Yes.

Q And the family requirements for gas depend more or less on the size of the family and the requirements are more or less fixed.

A I do not quite agree with that. I think there is quite a leeway in what a family may use. I think they have quite a bit of choice of how much or how high their consumption might be.

Q But I am suggesting to you they have a narrower range of choice with respect to the use of gas for cooking than they do for instance with the electricity for lighting ?

A Well that matter might not be the case, Mr. Chambers. I suppose that a family might leave all their lights on if the rate were low enough. Similarly they might have a kettle on the stove all the time if the rates were low enough.

Q And you are not prepared to go that far with me that generally speaking the range of saving or conserving is narrower with respect to the use of gas for cooking than it would be for electricity for lighting ?

A I would agree it is narrower but I do not think that

necessarily means it is in any way limited.

Q Then when we come to the use of gas for heating, the range is fairly well restricted there, is it not ?

A Well it would certainly have limits, but I think there is a fair sized range.

Q I am referring to furnaces.

A Yes, there are several alternatives. Turn down the gas burner if the house becomes too warm.

Q But in any case people will keep warm even if they have to pay for it. I mean that is the natural inclination ?

A Yes, although from my own experience how warm they keep may vary over considerable limits.

Q But there is a point to which they keep ?

A Oh yes.

Q Now just referring a moment to this question of saturation of market. You will agree with me in this will you not, that due to the depression in the early thirties and also in part to certain legislation about mortgages and so on, that existed in this Province in the thirties, that there was not a normal building expansion. Would that be a fair statement ?

A Yes, I think that is right.

Q And then we have had the war. From 1939 to 1944 where building was retarded in the matter of houses due to the limitation of materials ?

A Yes.

Q And we have now come to the period where there is a considerable shortage of homes ?

A Yes.

Q And it would be reasonable to expect I suggest in Calgary that there will be added to the Gas Company's system in the next

three, four or five years, a relatively large number of new homes. What would you say as to that ?

A There undoubtedly will be some added. I do not know how many, Mr. Chambers. That is a thing that I often wonder about, how many homes it will take to correct this serious situation at the present time. It may not take many.

Q But if very many new homes are built, it will constitute a new market in the light of the present market ?

A Yes.

Q Now Mr. Brownie, in Appendix 4 of Exhibit 137 as I understand it, you compute the relative costs of Drumheller coal and natural gas in Calgary ?

A Yes.

Q Now I take it from the figures used in the natural gas consumption column that the loads there given cover commercial and industrial use only ?

A Yes.

Q And so far as this Exhibit 137 is concerned, you have not made similar tabulation with respect to the use of Drumheller coal in competition with gas in the domestic installations in Calgary ?

A I do present certain data with respect to some new equipment in respect to domestic, Mr. Chambers, on Pages 5 and 6.

Q Yes, but I mean you have not made any similar tabulation as this and using the smaller amounts ?

A No.

Q Of consumption ?

A No.

Q Then would I be right in assuming that Appendix 4 is applicable to high load customers ?

A Yes, above domestic in size.

Q Those customers or consumers for the most part would be interested in steam coal, would they not, in changing over to coal ?

A No, I would not think so. Not necessarily, Mr. Chambers.

Q Well if you will - you say not necessarily. Will you explain your reasons for your answer ?

A Well I know that the Prince Albert power plant of the Canadian Utilities burns Drumheller coal, a large customer, larger than anything shown on this page.

Q Well now Mr. Brownie can you tell me what large plants in Calgary ever used Drumheller coal ?

A No, I cannot Mr. Chambers. I just do not know the answer to that. I was under the impression that the Imperial Oil Refinery used Drumheller coal, but I am not sure of that, and I also thought Burns & Company did and I may be wrong in that.

Q You are not...

A I am not certain. I can check that, but I do not know now.

Q Now Drumheller coal is a Lignite coal is it not ?

A Yes.

Q Now I suggest to you, Mr. Brownie, and I am asking you whether you agree with me that Lignite coal is not suitable or usable for a large plant except as powdered fuel or in special equipment installed for the purpose of using it. What do you say to that ?

A In the first place that I am not sure it is classified as Lignite. I believe it is sub-bituminous.

Q Well whether it is Lignite or sub-bituminous ?

A Well I am not an expert on the subject of the burning of coal,

Mr. Chambers, but I do not believe that is right, the question as you put it to me. I do not think it requires anything but ordinary stokers and ordinary draft provision to burn Drumheller coal in a large plant.

Q Now am I right in this understanding of your Exhibit 137, that it is intended to demonstrate two points. First of all that any rise in gas rates, will result in an immediate decrease in sales, due to increased use of competitive fuels and the reduction in the number of customers. Is that not a fair statement ?

A Yes, I think the likelihood is that some reduction in that respect will result.

Q And secondly, that this Exhibit 137 is intended to demonstrate that an increase in gas rates results in a decreased use by the average individual consumer, so that the actual revenue from a consumer remains constant or nearly constant whatever the gas rates ?

A I would agree with the first part of that statement. As to whether the actual revenue would remain actually constant is something I do not say in this brief. I say the tendency is for an increase in rates to be partially offset by a reduction in consumption.

Q And as I understand it, the Appendices that you have attached as part of your submission are designed to give the supporting data for those two statements ?

A Yes.

Q Now am I right in this that your submission in Exhibit 137 is intended to show or to indicate that you feel that the present gas rate in Calgary is close to competing coal prices ?

A Yes, in so far as these figures show that. That was the intention.

Q Well now then I would just like you to tell me yourself whether you think these figures show that. What is your judgment ?

A I think Appendix 4 indicates that,Mr. Chambers, I think the figures speak for themselves,/on a straight fuel cost comparison and I think in respect to the domestic that there is a much smaller spread between the cost of gas and the cost of coal than is commonly thought to be the case.

(Go to Page 5144)

Q In your report and particularly in Appendix 3, you discuss and you refer to a new type of heating system which is said, as I understand it, to have a wide application in house heating. Now, have you have any information, Mr.Brownie, as to the cost of that device?

A No.

Q None whatever?

A No.

Q And you do not know or have not any special information that would indicate that it could be obtained here at prices within the reach of the ordinary domestic consumer?

A Oh, I have seen pictures of it, and I have no doubt - I would not think it would be an expensive appliance. I do not think it is possible for anybody to say what the price would be. I do not believe it is in commercial production or was not at the time I investigated it.

Q Now, have you any information which would indicate that this device will burn lignite coal?

A Nothing except the literature I received, the paper I have received with regard to it.

Q Does it say it will burn lignite coal?

A No.

Q As a matter of fact, does not the name that they gave to it indicate that it is designed to burn anthracite?

A No, I would not think so.

Q Well, just more or less speaking out loud, it is an anthratube?

A You are talking about the anthratube?

Q Yes?

A I am sorry. I am looking at Appendix 3A. I turned too many pages.

Q Appendix 3, Mr.Brownie?

A I am sorry. I will have to take back what I said in answer to those questions. I would not say that that anthracite would burn lignite coal, certainly not.

Q What about the cost, have you any information about that?

A I would have to say the same thing about the costs there as I said in the other one. I have illustrations, and it is rather a simple thing. I do not believe it would cost very much, but I do not know what it would be.

Q Isn't it a fact, Mr. Brownie, that as far asyou know, anthracite coal has not been availabke to the Calgary market except at prohibitive prices?

A Well, I have a quotation which I use here as to the price of Canmore coal delivered. It was on that information I based my submission.

Q Anthracite coal has not been used edtensively or substantially on the Calgary market, isn't that right?

A I do not doubt but what that is the case.

Q Now, are you familiar, or are you telling me that Canmore coal is an anthracite coal?

A To my judgment, from a study of this literature, I think Canmore coal could be used for those appliances.

Q In other words, you say that the anthratube is designed for anthracite coal. You agree with that?

A Yes.

Q And whether or not Canmore coal is anthracite or something else, you think that it could be used?

A Well, yes.

Q In this anthratube?

A Yes, whether it is anthracite or not. It is very close to anthracite.

Q Yes. Now then, turning to the next Appendix 3A for the moment, where you are talking about the downdraft coking furnace, Mr. Brownie, and, as I understand it, you have not any specific information as to the cost of that?

A No.

Q And do you know whether that device will burn or handle the coal that has been locally available on the market?

A Well, from my study of the literature on this device, I came to the conclusion that it would be adaptable to the burning of Drumheller coal.

Q Can you tell me what coking coals are available on the Calgary market within the range of competition?

A Well, the only coking coals which I know of would be certain Crow's Nest coals.

Q Am I right in this, that this device that you talk about in Appendix 3A, would require a coal that is a coking coal, is that right?

A I did not come to that conclusion, Mr. Chambers. In my study of this thing I did not come to the conclusion that it had to be coking coal.

Q What significance is there in the name given to that? The performance of a downdraft coking furnace? Is there any significance in that name?

A Well, I would have to read this literature again, Mr. Chambers, I am afraid, to make sure what the significance of that is.

Q Well, do you agree with me in this that Drumheller is not a coking coal?

A No, it is not a coking coal.

Q Now, in Appendix 4 of Exhibit 137, you have compared the relative costs of coal and gas which is used in various

types of systems for commercial and industrial, as I take it?

A Yes.

Q And you there quote the price for coal which would compete with gas at various cost prices, and you have told me that the low volumes are not used. Therefore, I am assuming that this Appendix 4 is to give comparisons for industrial users and not for domestic?

A Yes, that is right.

Q And I think you told me this morning that that Appendix 4 does not take into consideration these other factors of storage and so on?

A That is correct.

Q But in order to come to a final conclusion as to the real point of competition between gas and coal in those fields, or in those commercial fields, or industrial, you would really have to have these other costs, would you not?

A If the consumer was entirely logical, yes.

Q Most business people nowadays are pretty logical in dollars and cents?

A No, I do not think entirely so, Mr. Chambers. And, as an indication of that, we have people in this city and on our system who are burning coal.

Q Well, might they not have some other interests in the coal?

A Beg pardon?

Q Might they not also be interested in other directions?

A Well, in a hundred and one different ways, yes. But we have many customers whom you might consider special cases.

Q But as against those you have a far greater percentage that did switch?

A The people that we are interested in is that narrow fringe

that we might lose which tends to snowball after a while.

Q Yes. Well, coming back to those other facts, the increase in the gas results in decreased use, so that the actual revenue from a consumer remains fairly constant. I refer you to Pages 8 and 9 of your Exhibit 137, and also to page 10 and finally Page 11. I refer you to those, where this statement is quoted by you, that regardless of cost the revenue per consumer in the cities of Calgary and Edmonton remains about the same. Now, as I understand it, you are there attempting to demonstrate that an increase in gas rates results in reduced consumption, the customer applying various measures of his own in order to economize?

A That is correct.

Q That is right?

A Yes.

Q Now then, as I understand it, Appendixes 1 and 2 deal with one of those means whereby he might economize?

A Yes.

Q And I think you said this morning that insofar as installation is concerned, it would be applicable to coal heating or gas heating?

A That is right.

Q And Appendix 2 gives the saving in two Calgary houses?

A Yes.

Q And you agree, as I understand it, that the savings given in that Appendix 2 would be a fairly average measure of the possible savings in fuel bills, would that be a fair way to put it?

A I would think so, yes.

Q Now, you have not given us the cost that the consumer would have to incur to instal this installation?

A No, I have not. I can.

Q Have you got those?

A I have some figures here. I am informed that Zonolite costs $41.00 per thousand square feet for material. A thousand square feet would be a good sized ceiling. It cost that plus five or six dollars labour to instal it.

Q Five or six dollars?

A Yes, that is what I am informed by the people who sell this material. That would be a man for a day. That is the ceiling only, of course. Rock wool or rock asbestos, 6 cents a square foot, plus labour. We also have an advertisement from the Calgary Herald some time in November or October of 1945.

Q I have no objection to the advertisement, but you are not vouching for the facts stated in the advertisement?

A No, I am not.

Q I have no objections to you talking about it?

A It is advertising shavings.

Q That would be ordinary?

A Baled planer shavings. One bale will cover about 40 square feet and will be three inches thick. Per bale it is 40 cents.

Q What about Mosstex?

A I have not figured Mosstex, Mr. Chambers.

Q As far as the shavings are concerned, is not there some question about the fire bylaw or regulation?

A There may be. I do not know. I know lots of them have been used in some places.

THE CHAIRMAN: Effective are they?

A They are very effective, Mr. Chairman. This literature I quoted on the effectiveness of insulation in the case

the shavings of a proper thickness, not unreasonably high thickness are equally as effective as expensive material.

Q MR.CHAMBERS: I am not arguing with you about labour costs, but I was wondering about that because I had some experience with that personally?

A I just got it from the people that sell these things and I just presented it for your information.

Q Now, coming to Appendix Number 5, obviously that is a graph prepared by somebody else?

A Yes.

Q Now am I right in assuming that you, as an engineer, before using the graph to illustrate this matter, tested its accuracy? Did you make any computation at all?

A No, I didn't. I checked some of the points, but I assumed that coming from an organization like the Bonneville, I assumed it would be accurate.

Q Now, I assume that you were prepared to consider this, or admit it is a fair illustration of what you would call a reciprocal graph?

A It is a long time since I had used that word, Mr.Chambers.

Q By that I mean, you understand I am going by what somebody else tells me, that is an illustration of a principle that consumption varies inversely with unit prices, or that the product or price and consumption, the total bill, remains constant?

A That is right.

Q Would that be it?

A Yes.

Q If the data of this curve has been submitted to statistical analysis, and if an equation of the reciprocal type has been fitted to the data, would you expect that a curve

obtained by rigid statistical analysis would represent those figures and would give a fair estimate of the power consumed for the rate?

A You are saying that if a curve were fitted to these points by statistical analysis, and if the equation of that curve were used to arrive at the annual cost of any rate, what the conclusions are?

Q To prepare an estimate for the power to be assumed for any rate?

A Yes.

(Go to page 5152)

Q And that the same reasoning could be . . . . . Do you suggest, Mr. Brownie, that the same reasoning could be applied directly to the problem of gas rates in Calgary?

A No.

Q Why?

A Because of these matters that you pointed out earlier, that there is greater flexibility in the demand for electricity than there is in the case of gas.

Q Now then we turn to Appendix 6, Mr. Brownie.

A Mr. Chambers, in regard to this curve, I do not say that you would get exactly the same situation with gas, but to me it is an indication that a customer will tend to stay with the same figures which he is used to paying for a utility service. I say in the case of gas it might vary up or down but he will tend to aim at close to that former - that experience as he can. I do not say it will be complete but I think that will be the tendency.

Q Now then, Appendix 6. That obviously was not prepared by you either?

A No.

Q Nor under your direction?

A No.

Q Now as I understand it, that chart is a study of the sale of gas other than natural gas in the State of Massachusetts about 26 years ago.

A That is right.

Q That was manufactured gas was it not?

A Yes.

Q Now I note on that chart, Appendix 6, that no gas is offered for sale at less than a dollar per mcf, is that

right?

A That is correct. Oh, I think there is one rate 91 cents.

Q Yes, I am sorry. 91 cents. That is right. Now do you consider that gas at those prices as outlined on Appendix 6 would find much use in house heating in a market such as that covered by this chart, Appendix 6?

A Oh I would not think so.

Q And those figures or that chart where the maximum revenue as I understand is about $30.00 per year cannot be applied to a market where most of the gas sold is used for heating and where the annual revenues are about $100.00 per customer as indicated on your Appendix 7.

A What do you say would apply to that situation?

Q That that chart, the information indicated on that chart is not applicable to the situation such as we have here.

A Yes, I think it is applicable in the way in which I use it. I presented that with the same idea as I presented the other curve; that it is an indication that sales tend to vary with rates.

Q And you will agree, or I think you have already told me that chart 6 is dealing with manufactured gas. That is right is it not?

A Yes.

Q And that we are dealing with gas that is obviously used for cooking purposes only.

A Cooking mainly. Perhaps water heating.

Q And perhaps water heating?

A And perhaps some house heating, I am not sure. There may be some.

Q At those rates? It would not be very likely that there

would be any appreciable amount?

A No, there would not be very much.

Q Whereas the large volume, by far the larger volume of gas supplied by your company to domestic consumers in Calgary is for heating purposes is it not?

A That is correct, yes.

Q Now then, turning to Appendix 7 where you deal with the Northwestern and the Canadian Western systems, Northwestern is the Edmonton situation?

A That is correct.

Q And Canadian Western, Calgary?

A Yes.

Q And as I understand it you conclude from that that regardless of the rate, the revenue per customer remains about the same?

A It tends to remain about the same.

Q Is it fair to say you also conclude from that that consumption varies inversely with the rate?

A Yes.

Q In other words the reciprocal type of curve, as used in Appendix 5, should be shown with these figures?

A It would tend to approach that. I do not say you can go at this thing and get a smooth curve.

Q Is this right, that we can obtain from Appendix 7 the annual consumption per customer by dividing the annual bill by the rate?

A Yes, I should have added there, Mr. Chambers, that there are variations over the years, variations in both companies, and I recognize that is bound to be the case due to weather conditions. Primarily this curve, these figures

were intended as a comparison between the Northwestern and the Canadian Western but not to show necessarily over all these years that you can complete a curve and get a smooth curve from these figures.

Q Would it surprise you that the application of statistical methods to your figures in Appendix 7 leads to this conclusion, that there is just as much justification for the statement that consumption remains the same whatever the rate as there is for the conclusion that total bills remain the same notwithstanding rate variations?

A It would not surprise me at all, Mr. Chambers. I would not attempt to make an analysis of that kind myself from these figures.

Q I am going to show you, Mr. Brownie, the statistical analysis that I have been talking about. I must confess it does not mean very much to me. Probably it means a lot more to you. Probably in fairness to you I should leave that with you and probably talk to you about it tomorrow.

A I think you certainly should, Mr. Chambers.

MR. HARVIE: Just what is it?

MR. CHAMBERS: I cannot tell you. You can keep that.

THE CHAIRMAN: Perhaps you need it until tomorrow yourself, Mr. Chambers.

MR. CHAMBERS: I need it a lot longer than that, I think.

MR. STEER: Under those circumstances, perhaps I do not need it.

THE CHAIRMAN: Do not give them all away.

MR. CHAMBERS: I think in fairness before I tender it as an exhibit, Mr. Brownie should have an opportunity

of going over it.

THE CHAIRMAN: Yes.

THE WITNESS: You have given me a different statement now. I would like to call to your attention, Mr. Chambers, the use to which I put this data. I did not try to draw a conclusion from it along the lines of these other curves. I was simply comparing Calgary and Edmonton.

Q MR. CHAMBERS: That is the reason I think I should leave it with you, so that you can give me your reaction to that tomorrow. I have also a statistical analysis of Appendix Number 7. That is the second one I just gave you.

A I thought we were talking about 7.

Q I have just given you also an analysis with respect to Appendix Number 5. Now I do not intend to pursue this further at the moment, but I would like you to give me your reaction to that tomorrow. Now, Mr. Brownie, am I right in this, that your report Exhibit 137 does not go so far as to say, nor are you now saying to this Board, that if the 2 cent reduction that was put into effect by your company as at the 1st of February, 1945 was restored that the revenue of your company would remain the same as it would under this present rate. You do not go that far do you?

A No.

Q Thanks.

THE CHAIRMAN: Mr. Fenerty?

MR. FENERTY: I thought I might wait, perhaps, until some of the others had asked some questions. I have not very much.

THE CHAIRMAN: Mr. Harvie?

CROSS-EXAMINATION OF THE SAME WITNESS BY MR. HARVIE.

Q Mr. Brownie, when you are talking about temperatures and so on and average degree days and such like, do you give any effect to whether there is a wind or whether it is a nice clear bright day?

A I do not, Mr. Harvie, because I do not know how to. If I did, I certainly would.

Q Is it a substantial factor?

A Yes.

Q And these figures you have given are not adjusted to give effect to that?

A No.

Q This morning you gave the sales figures for the years 1926 to 1944 and I think you said that possibly 1945 was available but you did not have them.

A I did not have an opportunity to check that at noon. I will.

Q Those figures are just what? Are they the total sales of your whole system?

A Yes, except for the Imperial Oil Refinery and the Ammonia Plant.

Q Would they include sales in Lethbridge?

A Yes.

Q And also gas taken from the Bow Island field and the Foremost field?

A Yes. They are sales by customers' meters.

Q Have you got similar figures for the purchases of gas in Turner Valley for the same period?

A Yes.

Q I wonder if you would be good enough to file that information with the Board either now or later.

A Yes. It is quite a lot of reading, Mr. Harvie.

Q If you could prepare it in statement form.

A I could put it in, yes.

Q I would appreciate it if you would. And at the same time give us the 1945 figures.

A Yes.

Q Can you also give us the sales during the same period, or the deliveries, originally I presume, to the Imperial Oil and the sales to the Ammonia Plant?

A Yes.

Q And include that in the same statement. Now on page 13 of your Exhibit 137, at the end of the page, you make the statement: "Fuel oil is directly competitive with natural gas at present rates to the Imperial Oil Refinery at about 75 cents per barrel." Am I right in assuming that when you say "present rates" that would be Schedule 6, I think it is, of your exhibit?

A Yes, that is correct.

Q That is the current rate that is now in effect?

A Yes.

Q And that rate goes as low as 10 cents a thousand?

A Yes.

Q For everything above 2 million feet. In other words about 60% of the sales to that account is applicable to the 10 cent rate?

A I do not know that offhand. I can check that.

Q On page 6 of Exhibit 137, at the end of the second-last paragraph on that page, you are referring to the Down-

draft Coking Furnace, and you say: "Over 100 of these furnaces are now in use in private homes and 7 companies have been licensed to manufacture them." Do I gather from that there are 100 of these in use in your system?

A No. I am simply giving that information from correspondence I have had with the author of that paper and 100 of them are in use somewhere in the United States, I do not know where.

Q You have had no experience with them in your system?

A No, I have not seen one.

Q And as far as the 7 companies are concerned, the same thing is applicable?

A Yes.

(Go to page 5160)

Q On Page 8 at the top of the page you say:

"In some cases the newly developed Anthratube, with only a slightly less favourable cost comparison, would be an important competitor because of its compactness and other advantages."

What information have you available that allows you to make a comparison of "a slightly less favourable cost comparison" ?

A The information I have given in that paragraph, I am sorry Mr. Harvie, I thought you were reading from another part, the information which I gave in dealing with this matter on Pages 5 and 6 - -

Q You told me I think when you were reading that, you did not know the cost ?

A I was dealing with fuel costs.

Q That was applicable to fuel costs ?

A Yes.

Q Now Appendix 7 of Exhibit 137, in it you give figures that are somewhat competitive as between rates and consumption in the Edmonton district, the region north of Calgary, and in discussing fuel costs and the value of gas in relation to coal, so far as Calgary is concerned, and you have dealt with it in your submission, - now have you any similar type of analyses as to the relative value of gas in Edmonton as compared with coals which are available in Edmonton ?

A Not for the purposes of this submission, Mr. Harvie.

Q Have you made any for any other purposes ?

A Oh I have, at various times, yes.

Q And with what results ?

A Well all kinds of results, Mr. Harvie.

Q Give me some of them ?

A I do not have them at my finger tips, Mr. Harvie. Just what do you mean ?

Q Well for instance you say that or I gather from Appendix 4 dealing with the industrial and domestic, that from the information contained in that Appendix you say, or you give the price at which gas and coal become competitive, or coal becomes competitive with gas, at certain values; have you similar information regarding that situation in Edmonton?

A I can give it, I do not remember the price of coal in Edmonton, I do not think I have enquired about the cost of coal in Edmonton or the price of coal in Edmonton in the last year or two. I remember very relatively from memory what the value of coal is in Edmonton and while I have made comparisons I cannot tell you at the moment the results of those.

Q I wish you would do so, Mr. Brownie and will you see what you can do on it ?

A Yes.

Q THE CHAIRMAN: Do you remember, in a general way, whether coal is competitive with gas in Edmonton, or otherwise ?

A In a general way, Mr. Chairman, I would say that gas can beat coal in Edmonton.

Q MR. HARVIE: Would that mean, Mr. Brownie, that the cost of coal in Edmonton is higher than it is in Calgary, because I understand your gas is higher ?

A Well generally speaking, Mr. Harvie, I would say "Yes, at the moment". Of course that - -

Q That is in view of the fact that Edmonton coal is mined right in the city in large quantities and in a great many locations

adjacent to the city and is available in all that section and that district ?

A I did not catch the first two or three words of your question.

MR. HARVIE: Will you read the question ?

(Reporter reading)

"Q Would that mean, Mr. Brownie, that the cost of coal in Edmonton is higher than it is in Calgary, because I understand your gas is higher ?

A Well generally speaking, Mr. Harvie, I would say "yes, at the moment". Of course that - -

Q That is in view of the fact that Edmonton coal is mined right in the city in large quantities and in a great many locations adjacent to the city and is available in all that section and that district ? "

A I am not sure that I follow that.

Q MR. HARVIE: I will put it this way, you are familiar with the price of coal in Edmonton and where it is mined there ?

A Yes.

Q You are also familiar with, that there are a great many mines adjacent to Edmonton ?

A Yes.

Q So everything else being equal you would say that the transportation cost should be less than in Calgary ?

A Yes.

Q Now having all those factors in mind, I would like you to give me the competitive figures if you can, and that is all I have to ask.

CROSS-EXAMINED BY MR. FENERTY:

Q Mr. Brownie, do you agree with the suggestion that during the past few years there has been more scope for improvement in the appliances for burning coal than in the case of appliances for burning gas ?

A I believe that is the case, yes.

Q And in dealing with this question of efficiencies, do you think it would be reasonable to suggest, without trying to get the exact figures, that, with the present gas appliances which we have and the coal appliances that we have heard about, now coming on the market, that you might expect approximately equal efficiency ?

A Well I am not any combustion man as I say, Mr. Fenerty, but from what reading I have been doing I believe efficiencies are likely to get closer together with this new equipment but that is about as far as I would care to go, in view of the fact that I am not qualified as a combustion engineer.

Q These statements which we have had read to us today from this Research Council publication, Exhibit 136, would tend to indicate that, would they not ?

A Yes.

Q Yes, and is it true, Mr. Brownie, that in Lethbridge today, coal in Lethbridge in the industrial and commercial circles, is very much competitive with gas ?

A Yes.

Q Now these various suggestions which you have given us as to the possible effect of an increase in the gas price and improvement in installations and so on, I want to suggest another matter that I do not think is at the moment entirely beyond the realm of speculation; have you read any of these

articles on solar heating which appear from time to time ?

MR. BLANCHARD: What kind of heating ?

MR. FENERTY: Solar heating.

WITNESS: Yes, I have.

Q MR. FENERTY: Have you for instance, read an article in Macleans indicating that two of those houses have been constructed even in the Canadian climate at the moment ?

A No, I did not see that particular article.

Q And you have read of course of these improvements with sealed glass, these double glass and so on ?

A Yes.

Q And those articles would indicate a method of heating, all the time in some climates and perhaps some of the time in even abnormal climates ?

A Yes.

Q And you think perhaps it is in the realm of possibility that developments along that line may give concern both to gas and to coal purveyors if the prices become too high ?

A That is quite possible.

Q It might be used in combination with auxiliary heating ?

A Yes.

THE CHAIRMAN: Any idea what those houses cost, Mr. Fenerty ?

MR. FENERTY: No, I do not know what that would cost but it is being used. It is being used in climates where the heating costs were not very great. In fact that seems to be the places where it is being used and if that is so it would seem to have a more useful sphere in climates where heating costs are not so great. I do know that more development along that line is taking place where heating costs are not

so great.

THE CHAIRMAN: It occurred to me that for fifty years at least the houses that are still in Calgary will be used for living in and will require gas or coal or something else to heat them.

MR. FENERTY: Unless we get too high an increase in rates.

THE CHAIRMAN: You are always anticipating.

MR. FENERTY: I do not anticipate a boom in these houses in Calgary at the moment.

Q MR. FENERTY: Now just one other thing, Mr. Brownie, there is a tendency to use electricity where it is available at rates that can be met, is it not, it has some advantages over gas even, would you like to admit that, I do not want to press you if you do not want to admit it ?

A I suppose it might have certain advantages.

Q What I have in mind is this, we have these discussions and the intensive advertising of General Electric and so on ?

A Yes.

Q Dealing with all kinds of electrical applicances, electric washing machines, dish washers, garbage disposals and so on and I suggest to you if somebody happened to be bitten with that particular bug and used equipment of that kind, which in turn would necessitate the installation of power lines, would it not ?

A Yes.

Q That there would be a tendency once those power lines were put in, to use electric ranges and so on ?

A Oh yes.

Q As we say "one thing leads to another" ?

A Yes.

Q I was interested in what you said about the Bonneville power and I want to read to you something I just came across in the News Week of January 14th, and I want you to see whether these statements are comfirmation of your ideas as to the trend:

"Because of Bonneville Dam Power electricity is cheap in the Pacific northwest and people use plenty of it, The Portland, Oregon, General Electric Company for example charges an average of 1.79 cents per kilowatt hour fer residential use, compared with a national average of 3.51. The typical P.G.E. household customer uses 2,534 kilowatt hours a year, more than twice the national average".

That does seem to bear out the idea, does it not ?

A Yes, I think so.

Q That it varies inevitably ?

A Yes.

Q And then further:

"In Portland and Salem, where winters are usually mild, more than 300 residences are heated by electricity."

So that we can get confirmation from some source, both as to electricity and gas and everything else, that the consumption varies up and down with the price ?

A Yes.

Q And new uses are developed ?

A That is right.

Q And we have even in a non-tropical climate like the Pacific Northwest climate, when we have cheap electricity, we have the heating of houses with it ?

A Yes.

THE CHAIRMAN: We will take a short adjournment now.

(A short adjournment was here taken)

THE CHAIRMAN: Anything further, Mr. Fenerty ?

MR. FENERTY: I think that is all.

THE CHAIRMAN: Mr. Blanchard ?

CROSS-EXAMINED BY MR. BLANCHARD:

Q Mr. Brownie, you I believe started to take gas from the Royalite Company in 1921, was it ?

A I think that is correct, Mr. Blanchard.

Q And the original rate from December 1921 to December 1925, I think it was, or sometime in 1925, yes, the rate was changed, yes, at the end of 1925, down to the end of 1925 I think the rate was thirteen cents, is that correct ?

A I am not sure of that, Mr. Blanchard. That sounds all right to me but I do not remember it.

MR. BLANCHARD: Perhaps I can file it a little later.

MR. STEER: It is all in those two agreements which are exhibited.

MR. BLANCHARD: Yes, and I think I am right.

MR. STEER: It can be found there.

MR. BLANCHARD: Yes.

Q MR. BLANCHARD: And during that period, I am looking again at the schedule which my friend Mr. Steer was good enough to give me, during that period your domestic sales, first perhaps I should put what your rates were, - in 1921 your rate was 35.02 cents according to the statement which I have and which I will submit, and perhaps you have it there, that was for domestic use ?

A Yes, I believe that is correct.

Q That is correct and in 1922 your domestic rate was 44.4 cents ?

A Yes.

Q And in 1923 it was 45.59 cents, is that correct ?

A Yes.

Q In 1924 it was 45.82 cents ?

A Yes.

Q And in 1925 it was 46.11 cents, that is your domestic rate ?

A Yes.

MR. HARVIE: In Exhibit 24 I cannot find those figures.

MR. BLANCHARD: I am reading from a statement of sales of gas which was furnished me.

WITNESS: Those are average rates, Mr. Harvie.

MR. BLANCHARD: Those are the average domestic rates ?

A Yes.

Q The average domestic rates ?

A Yes.

Q And in that period you brought your sales, - you brought your sales up to, in 1925, 3,357,000,000 cubic feet ?

A That is correct.

Q Correct, so that you were building your market, increasing your market during those years at the high average prices I have mentioned ?

A That is correct.

Q And in those years I presume that coal was available in Calgary ?

A Yes.

Q Yes. As a matter of fact all heating was done by coal when you came into the market ?

A Yes.

Q And you had to displace it ?

A That is correct.

Q And you displaced it, you displaced coal as the heating medium in the City of Calgary at these higher average rates, that is correct ?

A We displaced some of them at those higher average rates.

Q Beg pardon ?

A We displaced some of this coal at those higher average rates.

Q Well let us take your 1925, you sold 3,357,000,000 to domestic consumers only ?

A Yes.

Q Would you say that nearly saturated the market at that time ?

A I would want to examine that picture, Mr. Blanchard, that figure is materially higher than the 1924 figure and very materially higher than the 1926 figure.

Q The 1926 figure you went down to 2,290,000,000 and then in 1927 you went up again to 3,356,000,000 and in the following year, 1928, 3,294,000,000 and then you had a rate of 36.5 average; in 1929 you went to 4,085,000,000 at which time you had 33.04, that is correct ?

A Those are the correct figures.

Q As I suggested to you first, with those average prices of gas you gradually displaced the use of coal in the City of Calgary until you had reached practically a saturated market ?

A Yes.

Q Yes.

A We have reached a very high saturation now, an event which was, which has been brought about over the years and for those same years our rate varied from a high of 46 cents down

to 28 cents. It is hardly fair to say with those higher rates in the earlier years, we were able to saturate the market. I would question that 1925 figure. I would like to know more about that before I commit myself to what it means.

Q Well in 1932 when you had a rate of 33 cents your domestic sales amounted to 4,453,000,000 ?

A I thought you were at the 1933, Mr. Blanchard.

Q That is what I meant ?

A Yes.

Q 4,453,000,000, at which time your price was an average of 30.03 cents ?

A That is right.

Q And in 1942 you only sold 4,456,000,000 ?

A That is right, without correcting for temperature, yes.

(Go to Page 5171)

Q But generally speaking you have built a market gradually, increased your market from 1921 on, displacing coal furnaces throughout the City when your prices were higher than they are now ?

A That is correct.

Q Let me ask you this. At what point do you think coal becomes competitive with gas where you already have gas installations in the City ?

A Coal is competitive with gas right now, Mr. Blanchard, in certain places.

Q I am speaking of the City of Calgary.

A We have people burning coal in Calgary today.

Q Domestic consumers ?

A We have some people burning coal.

Q Domestic ?

A Domestic, yes.

Q And did they have gas furnaces in and change back to coal. Do you know of any such cases ?

A No, I do not.

Q You know of no cases of that. Now then take the present situation where we have nearly every householder with gas furnaces in or an old converted coal furnace. Now under those conditions at what point do you consider that coal becomes competitive with gas ?

A I do not know Mr. Blanchard.

Q You would not say that it becomes competitive when you can simply get it at the same cost as gas ?

A I would not be surprised if it might not become competitive and you might start losing the first customer at that point or before that point.

Q Take your own case and not as a witness for the Gas Company, your own case as a householder. Assuming today you could go out and get coal put in your basement and that the cost of your heating for the month would be exactly the same as gas. Would you for one moment dream of changing over to coal ?

A No.

Q Do you think anyone would ?

A Yes, I think so.

Q Why ?

A Because they have other interests.

Q What other interests ?

A Perhaps the man drives a truck. Perhaps he hauls coal. Maybe he has an interest in a coal mine and if you go into all the special cases you start at some point and lose the first one and you go to the next fellow, the rate goes up a little higher and you lose him and the thing starts to snowball.

Q I am asking you whether you think any man in this City or a householder unless he has some special interest and might lose his job if he did not use coal or because he drives a coal truck, do you think any householder with any sense at all would change to coal if he could not get it cheaper than gas ?

A No, not unless he had some special interest, but I think there are many people who have such a special interest.

Q Someone who owns a coal mine or an interest in it ?

A Or someone who owns a garage and services trucks, and I know that from my own experience in Edmonton.

Q Do you think a man would make the investment necessary to put coal bins in his basement and bring a lot of coal dust into the house and go to the expense of changing his furnace to a

coal furnace simply because he drove a truck for a coal company ?

A I have no doubt some people would.

Q You do not imagine there would be many of them ?

A Well that sort of thing starts in with a few and it grows, Mr. Blanchard.

Q Now during these years 1921 to 1940, how did the cost of coal compare with the cost of coal today ?

A I do not know Mr. Blanchard. I have not made a study of that.

Q Do you think the prices of coal during those years in which you are charging a high average rate would be of value to the Board with a view to ascertaining what the reaction of a householder is as to prices, the factor of price alone ?

A They might be.

Q I mean, assume that you could get coal - I do not know that it is true, but possibly it might be of interest to the Board to know - assuming you could get coal in 1925 at one-half of the cost per B.T.U. that you are charging as your average cost of gas, that would give the Board some idea how far the cost affects the decision of the householder.

A Yes, that would be an indication.

Q You mentioned Drumheller stoker coal ?

A Yes.

Q What type of coal is that. I mean what is it, in lump ?

A No, it is a fine coal. I have forgotten the exact size, but something like between a quarter of an inch to an inch and a half to three-quarters. Something like that.

Q That is definitely not suitable for domestic ?

A It is suitable for domestic stoker.

Q For domestic stoker ?

A Yes.

Q Does it need special equipment ?

A Yes. You have to have a stoker.

Q You would have to have a special furnace ?

THE CHAIRMAN: No. Stoker is a special thing that feeds it in the furnace.

Q MR. BLANCHARD: You would have to have special grates ?

A That is part of the stoker.

Q I do not understand these things at all. Now your figure of $4.00 landed in Calgary, I think that is your figure ?

A Yes, for car load lots.

Q Car load lots and is that delivered to the purchaser ?

A Yes.

Q Delivered to his bins ?

A Yes.

Q It is. I thought you said -

A That is not for domestic use, that is commercial.

Q I beg your pardon ?

A. That is not for domestic use.

Q I understand that.

A I have a higher figure for coal for domestic use.

Q But you are speaking of Drumheller stoker coal as readily available at $2.15 per ton f.o.b. cars at the mine. Freight to Calgary is $1.30 per ton. This means that this coal can be delivered in Calgary for around $4.00 per ton. You are allowing 55 cents for delivering per ton ?

A Yes.

Q That is fair is it ?

A That is my information Mr. Blanchard, that it can be done for that.

Q Now I understand your company is a dealer in gas appliances of all descriptions ?

A No, that is not correct. We do not sell gas appliances.

Q You do not sell any gas appliances ?

A We sell furnace burners.

Q Furnace burners ?

A Yes.

Q But no other gas appliances ?

A No.

Q Have you been advertising or carrying on a campaign to encourage your customers to use more economical burners ?

A That is correct.

Q In their furnaces, their stoves, their ranges and so on ?

A Yes. We advocate using uptodate appliances.

Q And that is over a period of years ?

A Yes.

Q Has that been successful, that campaign ?

A Well I have no information about the sales of gas appliances in Calgary Mr. Blanchard. As I say we do not sell them. We encourage the use of modern appliances but we leave the sale of them to...

Q Why do you encourage the use of modern appliances. It cuts down the consumption of gas ?

A Yes.

Q That means that they use less gas ?

A Yes.

Q Why do you do that ?

A It tends towards good public relations.

Q Now, insulation of houses. You give two examples there and my friend touched on one. In one case the saving per annum

was 46,000 cubic feet of gas. Is that correct ?

A Yes.

Q And how much.?...

A 42,000.

Q How much would that amount to in a year, how much in money at your average rate, would that amount to ?

A That would amount to $10.50 to us. Something more than that to the customer on account of the customer...

Q Somewhere around $11.00 a year ?

A Yes.

Q Or less than $1.00 a month ?

A That is right.

Q And do you think he would make that investment to save less than a dollar a month ?

A Hundreds of people do Mr. Blanchard.

Q Is it for that reason or for greater comfort ?

A Far greater comfort.

Q It is not to save $90.00 that a man insulates his house ?

A Partly.

Q It is ?

A I think that is a very important part of the reason he insulates his house. When a customer complains of high bills that is one of the answers, to insulate his house.

Q How much would it cost to insulate his bungalow approximately ?

A On the basis of these figures I gave to Mr. Chambers it would cost him $50.00, $60.00, $70.00.

Q For the whole house ?

A For the ceiling only.

Q For the ceiling only ?

A Yes.

Q I mean the ceiling throughout the house ?

A Yes.

Q And that includes labour ?

A Yes.

Q Well then he would get his investment back in five years by those figures ?

A Yes.

Q Now you mentioned the saving. Less gas will be used in heaters because they would insulate the heaters, and that less gas will be used in the stoves because they will put in modern stoves. That is so, is it. That is if gas were high.

A They will use more modern and more efficient appliances.

Q I am wondering why they did not do it when you were charging them forty-six cents a thousand cubic feet ?

A They were not available.

Q Not available, they were not ?

A No. I am comparing on Page 3 Mr. Blanchard, I refer in several cases to early American Gas Association requirements and then I refer to present American Gas Association requirements and when I speak of early American Gas Association requirements I am referring to data from American standard approval requirements for domestic gas ranges effective June 1st, 1934 and when I speak of modern appliances I am referring to standards as of January to March 1938.

(Go to Page 5178)

Q And have any of those been put in use since 1938?

A Some. I do not know how many.

Q How much gas is used in a hot water heater on an average, have you any idea, in a month?

A The hot water heater uses about twice as much as a gas range. I would say a hot water heater in an average home would use perhaps 40, that is just more or less a guess.

Q 40 thousand cubic feet?

A 40 thousand cubic feet.

THE CHAIRMAN: Is that with or without a thermostat?

A Well, my figure is not sufficiently accurate to say which it is.

MR. BLANCHARD: That would be for hot water, 40 thousand a year?

A Yes, something on that order.

Q And the gas range would be half of that?

A Yes.

Q About 20 thousand?

A Yes, that is just a very rough figure from memory.

Q That is a total of 60 thousandd cubic feet a year?

A Yes, something like that.

Q Is that right?

A Yes.

Q And if you increased the cost of that gas by five cents a thousand cubic feet, that would amount to $3.00 a year?

A Yes.

Q That would be the increased cost by reason of the five cents for your heater and your range?

A Yes, that is right. Those figures are very rough, Mr. Blanchard. I could check those if they are of interest to you.

Q Well I am just trying to get at the approximate. What I am getting at is this, do you think that anyone would get a special kind of heater and a new range to save $3.00 a year?

A I certainly do.

Q You do?

A Yes. We have many customers come to us complaining that their gas bill this year for certain months was $2.00 higher than it was last year.

Q For a month?

A Yes.

Q But we are speaking of $3.00 a year for the gas heater and the range?

A Yes.

Q By the way, what is the present cost of fuel oil, do you know, laid down in Calgary?

A No. I did examine that, Mr.Blanchard.

Q I see reference is made to the competitive, where the price would be competitive, but I did not know what the price would be in Calgary, and I do not know whether we have any record of it?

A I do not think that I referred to it in my report.

Q Possibly Mr. McDonald did?

A I accepted those figures.

MR. STEER: It was 75 cents a barrel.

A THE WITNESS: It is on page 13.

MR.BLANCHARD: I did not know who it was being sold to.

A That is the price in the case of the Imperial Oil Refinery, and any figure I would have there as to the market value of the fuel oil would not be of much interest, because I am talking on page 13 of the Imperial Oil Refinery using their

own oil and their own furnaces.

Q And you say that the price becomes competitive at 75 cents per barrel?

A My recollection is, Mr. Blanchard, that the market price of that type of oil is around $1.15 a barrel or something like that. I am subject to correction on that.

Q $1.15?

A Yes.

Q Mr. Brownie, I asked yesterday if I could be furnished with certain figures for the City of Lethbridge. I take it you have not had an opportunity to get them?

A No, I have not had it. I will try to get them.

Q I will postpone any questions I have with regard to that. That is all I have now.

Q THE CHAIRMAN: Mr. Brownie, I noticed in Calgary during the last three years there has been a tremendous number of new houses built, and do you know what proportion of those have put in coal or coal furnaces?

A I would think none of them, Mr.Chairman, who are capable of being served from our mains.

Q And they, of course, have the modern furnace that is simply made by a tinsmith and have a properburner?

A Yes, I think most of them would have.

Q And if they wanted to convert to coal they would have to scrap that investment?

A Yes.

Q Unless you had another customer?

A Yes.

MR.BLANCHARD: Mr.Chairman, I would have put in the statements that were referred to, but I have only the one copy, and I will have the copies made.

Q THE CHAIRMAN: Well, I have another type of public utility to deal with, Mr. Brownie, and I notice when there is an increase in price there is a sharp decline in sales. People become annoyed. I have also noticed that it takes only a matter of four or five weeks until the sales go back to the old level in spite of the increase in price. Now, that is a commodity that is being sold. Would not the same be true of gas, that you would have a sharp decline, people would say, "I am not going to pay that price for gas" and after a week or two they would forget about it and go back to the old basis?

A Well, on the basis of my study, Mr.Chairman, that was not the conclusion that I came to. I concluded that there would be some sort of an inverse relationship between price and sales.

Q And conversion from coal to gas is going on at a rapid rate in Edmonton, right now, is it not?

A Yes. Of course, we have war time influences there, which certainly disturbs that situation. Coal was scarce. Its deliveries were very uncertain, and under those conditions people were clamouring for gas almost at any price.

Q And the plumbers were helping out by putting on a campaign to sell furnaces?

A Yes.

Q Mr. Brownie, every commodity that I know of, every commodity that I use, has gone up in the last few years, and I suppose that is due to the inexorable law of supply and demand. Why shouldn't the same thing happen to gas? Why should gas be in the favoured position? Why should it remain static when every commodity goes up?

A I do not see any logic, Mr. Chairman, to suggest that gas should

go up because other commodities have gone up.

Q They all have. Why draw the exception? Why should gas be the exception? You may be quite right, Mr. Brownie, I do not know?

A Because the same factors which caused other commodities to go up in price are not working in the same direction in the case of gas.

Q War was one factor?

A Yes. However, those factors might be at work, but they have so far not worked to the extent that they have caused that result.

Q In your submission, Mr. Brownie, you have a lot of figures which are averages. I realize that you cannot do anything else but use averages. But is it not the case that to arrive at a final conclusion by the use of averages may be misleading and perhaps dangerous?

A You are talking about average efficiencies?

Q No, average, I do not care what it is, whether it is an average of cubic feet or consumers or prices. Averages always can be misleading and perhaps dangerous, is that right?

A Oh yes, it is quite possible. I think you would have to use judgment on how you used such figures.

Q Thank you very much, Mr. Brownie. Now, anyone else?

M. McDONALD: Just a couple of questions.

THE CHAIRMAN: I beg your pardon. I would not have intervened had I known.

MR. McDONALD: That is quite all right, Sir.

.....

CROSS-EXAMINATION BY MR. McDONALD

Q I think you did tell us, Mr.Brownie, that there is room for improvement in gas appliances?

A Yes. I do not know whether I told you or not, but I agree with you.

Q In your opinion there is room for improvement?

A Yes.

Q And the gas industry will apply the same ingenuity and research to maintain their market as the coal industry, comparatively?

A Well I think it will, Mr. McDonald. They have not got as much to work on.

Q What gives me that idea, Mr.Brownie, is that almost any magazine you pick up now, you will find an ad. "Use natural gas", "Use Gas", "Use Servel Electrolux Refrigerators", or something of that type. Gas is kept constantly before the public?

A There is an advertising campaign. From observation I have been watching the magazines, and I have noticed that you see a lot more ads. for electric ranges than for gas ranges. That is my experience.

Q Yes. I am not talking so much with regard to competition with electricity, but keeping gas before the public?

A Yes.

Q And that will no doubt counteract to some extent the efficiency of coal appliances, it will tend to counteract that?

A You mean the advertising on the part of the company?

Q Yes.

A The advertising of the gas industry will tend to overcome improvements in the coal burning equipment, is that what you

mean?

Q It will counteract the advertising by the coal industry, or the advertising of the efficiency by the coal industry of their type of equipment?

A Yes, it should leave the gas industry in a better position than if it did not advertise.

Q Now, I was interested in this question of insulation. You mentioned bungalows. Have you any figures on insulation of two-storey houses?

A I have not. The reason I have not, I could not find one. It is surprisingly difficult to find a house that was insulated as of a certain known date.

Q Yes?

A And a house that was not subject to other variables such as change in the tenants, or made into suites. I looked for two-storey houses but I couldn't find them without being subject to the variables.

Q So that you could not give us a similar estimate of the percentage of savings.

A No. I would say the percentage of saving would be smaller.

Q The percentage of saving would be smaller?

A Yes.

Q THE CHAIRMAN: I insulated a house, a two-storey house, in about 1937, and there was not very much difference in the gas bill, but I had very much better heat in the house.

A That is quite possible.

Q There was very little difference in the gas bill, but I do certainly think it was better heated, so that from that point of view the insulation was better.

A That is quite possible.

Q MR. McDONALD: Can you verify the statement of the

Chairman that there was an increase in the comfort in the home?

A Yes.

THE CHAIRMAN: There is no doubt about that.

Q MR. McDONALD: So that will tend to maintain the gas market particularly in a two-storey house, where a small investment will gain you some considerable comfort?

A Well, I do not know how that would tend to maintain the gas market. On the average I would think it would tend to reduce the gas consumption.

Q Can you tell me with regard to the relationship between bungalows and a two-storey house in Calgary?

A The number do you mean?

Q Can you tell me the number of bungalows as against two-storey houses?

A No, I cannot.

Q No material on that?

A No.

Q Would you say this, that bungalows on the average are smaller homes than two-storey houses?

A I would think so.

Q They are smaller consumers of gas?

A I would think so, yes.

Q I was interested in this question, in regard to Appendix 2, Mr. Brownie, with regard to the saving by insulation, you point out that the annual consumption figures shown include cooking, water heating, refrigeration and garage heating, and the net saving in house heating should be appreciably more than the gross savings on the annual figures?

A In terms of percentage, yes.

Q Now, I am going to suggest to you that with the exception of

the refrigeration and the garage heating, that cooking and water heating are two material elements in house heating. For instance, this morning when I got up I went into the kitchen, I didn't bother going downstairs to bother with the furnace, and I turned on my range?

A Yes, that is true.

(Go to page 5187).

Q I am suggesting to you that this question of putting jackets on heaters in the basement, that except for the summer months the heat that is generated from your tank that is in the basement or on the first floor is material in house heating. It goes into the total heating requirement of the house.

A Yes, it would. I do not know whether it would be an efficient way of heating the house or not. It might be more efficient to cut down the heat in the water heater and put on more heat in the furnace.

Q But the heat that you are referring to was with an installation with the burner right in the middle of the tank, is that what you were thinking of? You were thinking of a Rudd heater.

A Yes, I was thinking of that kind of equipment where there was no loss.

Q The heat from the tank, the tank is jacketted in, in addition to a more efficient burner?

A That is correct.

Q That is what you had in mind?

A Yes. You would not have as much heat lost to the atmosphere in the basement.

Q I am suggesting to you except in the very warm summer months, that is an element in heating the house. There is no really efficient loss in heating value to the consumer.

A If that is an efficient way of heating a house, as efficient as a furnace is, Mr. McDonald, you are correct. But that is something I rather doubt.

Q Then in the summer months you are on a minimum rate

anyway and the extra heat you are losing, the extra gas that is being burned in the hot water heater is not an item of expense.

A Yes, you may be on the minimum rate all right.

Q A dollar and a half a month and 4 thousand cubic feet a month, you are fairly close.

A I do not know about that, Mr. McDonald.

Q There is one other thing where we are dealing with high bills. Have you a record of the high bill complaints the company received over a number of years?

A We undoubtedly have a record of them. Whether they can be picked out or not. . . . They can be dug out but I do not know just what you have in mind. We undoubtedly have a record. We have a record of every complaint.

Q Well have the high bill complaints decreased since there has been a decrease in the price of gas to domestic consumers say from 1943?

A I do not know that, Mr. McDonald. I have never inquired.

Q There was one other thing. I suggest to you that it is customary in Calgary at this time, in building almost any kind of building, say an apartment house or a household of any kind, to make use of the space in the basement for living space of some kind. Would that be a fair statement?

A Well in houses, domestic establishments, there is a tendency to use some of the basement space for living space.

Q Yes.

A I do not know whether it is in case of commercial buildings although I have no doubt with the present

housing shortage that certainly any space would be made use of.

Q I am suggesting to you that most apartment houses built in the last 10 years have been built with the idea of basement suites, rooms for the accommodation of tenants throughout the entire basement.

A That might be, Mr. McDonald.

Q I am suggesting to you that if they change to coal there would be an immediate loss of revenue.

A That is correct in one of those buildings.

Q Because you would require coal storage.

A Yes.

Q And in addition to that you would have coal dust when coal was being delivered, say once or twice a year.

A Yes.

Q And if it was a manual firing proposition, you would have coal dust every day,all of which would interfere with the use of the basement and that would be a very material item in a domestic household.

A Yes, that would be an item. But there are other items in the other direction, Mr. McDonald. Many people have prejudices about gas.

Q Yes. I was interested in that. You mentioned there are some homes in Calgary that do not use gas. Is it not so that some people complain of fumes and the effect on their health?

A Yes, they complain of fumes and they complain of silver being tarnished and complain of plants not growing and grease on the wall and one hundred and one things. Whether they are right or wrong that is certainly a

factor.

Q Those are what we might call the inconveniences of gas.

A Yes.

Q MR. STEER: Alleged.

A Yes, alleged. That is correct.

Q MR. McDONALD: Now would it be a fair statement, Mr. Brownie, that the demand for Drumheller stoker coal is now at about the limit of the deliveries being made by Drumheller mines of that commodity?

A I do not know that, Mr. McDonald. It would not surprise me to find that available deliveries ultimately are almost unlimited. It may be that what you mean is by screening alone that particular size might be near the limit of its availability.

Q Yes.

A But I should think mines would have various ways of dealing with that situation if the market were available.

Q In other words, they would have to crush?

A They might have to crush or they might be able to mine more economically if they did not have to worry about getting out lump. There might be more fines available for stoker coal.

Q If it was crushed there would be an additional cost?

A There would be some cost.

Q 50 cents a ton?

A I have no idea what it would be.

Q If there was a material change in the demand the possibility of an increase in price might immediately arise.

A That is a possibility or it might work the other way, Mr. McDonald. If a possible market suddenly opened up for

that coal it might mean that the price would come down. If a dealer found he could sell a lot more coal, he might be willing to accept a smaller price. That was the experience in Edmonton when the rates came down up there.

Q Have you any recollection of this situation during the depression, coal was transported by all and sundry truckers, anybody who owned a truck was hauling coal?

A Yes.

Q Have you any recollection of that situation?

Yes, I believe that was generally correct.

Q I am suggesting to you that the very low price, the change in the load of the Gas Company in Edmonton in the early thirties was due in part to this, what we call temporary situation, truckers trying to make a living hauling coal and therefore delivering it very cheaply to all and sundry.

A It was a contributing factor.

Q It was a contributing factor?

A Yes. I do not know whether it would have been temporary or not, Mr. McDonald.

Q There was a change in, as I recollect your figures, 1934 when the situation righted itself.

A That was a change because we reduced the rate. It was not a change in the coal situation.

Q Well maybe the two factors had an effect.

A I doubt very much. I may be wrong, Mr. McDonald, but I doubt very much if that situation of low priced coal and many people trucking it changed very much in the year 1934.

Q Has there been any change in the situation of the gas deliveries since the close of the war or since August?

A Yes, there have been some changes.

Q What, briefly, are they?

A We have lost some air schools and we have lost at least one large industrial plant. I have not analyzed the situation generally to see whether there has been a general dropping off. I know we have lost some business.

Q Has the change been greater than you estimated in the last time you were giving evidence for the last half of 1945?

A Well I just forget my figures, Mr. McDonald. I do not believe I anticipated any drop in business in 1945. I think I assumed the Pacific War would continue to the end of 1945 and in 1946 I first started to decrease the load for the ending of the war. I do know that 1945 the actual figures somewhat exceeded my estimate.

Q Yes, even with the loss of these industries and schools that you mention?

A Yes.

Q Is that made up by an additional domestic load or an additional commercial load?

A Well I have not analyzed those figures in detail, Mr. McDonald.

Q Could you do that for us within a reasonable time?

A Yes.

Q Now have you any information with regard to the Ammonia Plant load?

A No, sir, nothing more than has been presented here.

Q No information in regard to how long that load will continue?

A No.

Q Now have there been any changes recently in large buildings in Calgary, changing from coal to gas?

A I do not know, Mr. McDonald. I think there were some medium sized buildings in 1945 but I cannot name them for you.

Q Changed from coal to gas?

A Yes.

Q One I notice, Mr. Brownie, that uses coal in the centre of the city is the Noble Hotel.

A Yes.

Q Is that about the only large building in the centre of the city that uses coal?

A No, there are others.

Q There are others?

A Yes.

Q In that particular instance, do you know the owner of the hotel is also the owner of a coal mine?

A I have heard rumours to that effect. I think, Mr. McDonald, there are 60 or 70 buildings on our system that burn coal.

Q You mean on the system as a whole?

A Yes.

Q Most of them are in Lethbridge, are they not?

A Most of them are in Calgary. Over half of those buildings would be in Calgary.

Q What is the situation in Lethbridge as to the saturation of possible outlets in Lethbridge? Maybe we will let that stand until we have Mr. Blanchard's information.

A Yes.

Q Now on page 15 of your submission, Mr. Brownie, your last item on page 15, you say this: "Any gas rate increase will have a cyclic effect of decreased consumption, further rate increases and so on. This process would not have to

advance far before coal becomes actively competitive over a wide range of consumers." Now can you just point out briefly in your Brief as submitted here the facts on which you base that conclusion.

A You mean the first sentence or the second or both?

Q Well we can deal with them separately if you like.

A I think the first sentence is self-evident. I did not go to any trouble to try to prove that at all.

Q No, and we will let that one stand.

A With regard to the second sentence, item No. 7 starting on page 5 and the information given on pages 7 and 8.

Q Have you any other items you would refer to in reference to that?

A I thinkthose are the only places and the Appendix 4 of course.

Q Well now just with regard to the first sentence, Mr. Brownie, do you want to qualify that at all, I mean:

> "Any gas rate increase will have a cyclic effect of decreased consumption, further rate increases and so on."

Is that not rather a broad statement?

A What I am getting at in that, I am stressing that particularly, Mr. McDonald, that if an increase results in decreased consumption, that will result in a further increase in rates and further decreases in consumption. I am thinking of that cycle.

Q Yes.

A And it is also the contention of this Report, that any gas rate increase will result in some decrease in sales, and that is the start of the cycle.

Q Yes, you first mean, any gas rate increase which has the

effect of decreasing consumption will start the cycle.

A Well I go beyond that. It is the contention of this Report that any gas rate increase will tend to a decrease in sales.

MR. McDONALD: That is what I wanted to make clear and that is all.

.....

RE-EXAMINATION BY MR. STEER.

Q Mr. Brownie, my learned friend, Mr. McDonald, was asking you about improvements in gas appliances and you made a statement which I think was perhaps to this effect, that there was not so much to work on, will you amplify that statement?

A I mean that the efficiency of gas appliances now is higher in relation to the ultimate possible efficiency than the efficiency of coal appliances now in relation to those ultimate possible efficiencies of coal appliances; in other words there is more scope for improvement in the case of coal appliances than in gas appliances.

Q Yes, and with regard to the starting point, what is the maximum possible efficiency of coal as compared to gas, what would you say or are you prepared to say?

A I would say the maximum possible efficiency of coal in their installations is higher than gas.

Q Are you prepared to say by how much?

A No, I do not know the figures offhand.

Q Would you be prepared to give us the hydrogen content of coal?

A I would rather not go into that subject, Mr. Steer.

Q Now then the Board asked you about the averages.

A Yes.

Q Do I understand that if you take an average, for example, the average efficiency of coal at 55%, that that means that there are some installations where the efficiency might be as high as 70% and there are other installations where the efficiency might be as low, we will say, as 40 or 45%, there are those broad stages on either side of the average?

A That is correct.

Q Is that right?

A That is right.

Q Now the problem of determining whether he is going to shift from one fuel to the other, as I understand it, is an individual problem?

A That is correct.

Q And everybody, every individual has to settle that for himself, having in mind these particular efficiencies of his equipment?

A Yes.

MR. STEER: That is all.

.....

CROSS-EXAMINATION BY MR. CHAMBERS.

Q Just one question arising out of my friend, Mr. Steer's questions. Did I understand you to say that in your opinion there is more room for improvement in appliances for the use of coal than there is for improvement in the appliances for the use of gas, is that right?

A That is correct.

Q Just how do you know that?

A Well I know this, Mr. Chambers, that gas starts out at

a disadvantage because of the hydrogen. That the ultimate efficiency of gas is more than the ultimate efficiency of coal. I also know this, that in all these submissions we have used a lower average efficiency for coal than for gas.

Q Yes.

A Now if coal has a higher upper limit and a lower lower limit, there is bound to be more opportunity for improvement in the case of coal than in gas.

Q What I had in mind was this, that it is impossible for anyone to say as to what improvement and inventions might be made in these appliances, I mean the unexpected has happened in the past, as we look back.

A Yes.

Q And I suggest to you, and I put it to you in all seriousness, that nobody can foretell the type of improvements you will have in gas appliances or coal appliances; it is true the coal industry may be working on it, spending more money on it, but I suggest to you that research is going on all the time and there is just as much reason to expect that there will be important improvements in the gas appliances, just as important as there are in anything else. Now what do you say as to that?

A Well I have said, Mr. Chambers, there is more room for improvement in coal appliances than in gas appliances.

Q You still think so?

A I will tell you why: Because you have the higher upper limits and the lower lower limits to start with.

MR. CHAMBERS: Thank you.

.....

MR. McDONALD: Mr. Chairman, I have some rebuttal evidence from Mr. Zinder and I am very anxious to finish the question of competitive fuels today and to leave tomorrow to deal with the other two points in Mr. Zinder's evidence.

THE CHAIRMAN: How long will it take, Mr. McDonald?

MR. McDONALD: I think we can finish well before 5 o'clock.

MR. STEER: Are you going to have something to say on these other matters?

MR. McDONALD: Yes, and I suggest that we might leave tomorrow for that.

MR. BLANCHARD: I do not think we are going to get through with competitive fuels today.

MR. McDONALD: The only point I had in mind was that we might deal with Mr. Zinder's rebuttal and then leave the other competitive fuels, let them stand over until the week of February 4th.

THE CHAIRMAN: I want to oblige you and your witness, Mr. McDonald, but I have had enough for today.

MR. STEER: Here, here.

THE CHAIRMAN: I will start earlier in the morning if you like.

MR. McDONALD: Well I was hoping we would finish by 4.20 tomorrow afternoon.

THE CHAIRMAN: I want if possible to catch the five o'clock train.

MR. McDONALD: That will just give you time to do that, Mr. Chairman.

THE CHAIRMAN: How about starting at 9.15 then?

MR. HARVIE: I wonder if I might just ask this witness one question on this point before we close?

THE CHAIRMAN: Yes.

CROSS-EXAMINATION BY MR. HARVIE.

Q In Appendix 4 of Exhibit 135, Mr. Zinder's brief, I notice that there is an average number of customers for the various years, 1934 to 1944, and that for the year 1944 there are some 23,718 domestic consumers on your system.

A Yes.

Q And I also note in Exhibit 134 that there is, in the rate schedule, that the rate No. 2, the domestic combination rate, has a minimum of, what is it, $1.50 a month?

A Yes.

Q And Rate No. 1, which was the old general rate, had a minimum of $1.00 a month?

A Yes.

Q Are both those rates being used at the present time?

A Yes.

Q And are there many of these 23,718 customers that only pay the minimum rate?

A You mean, how do you mean by "the minimum rate", you mean every month in the year, Mr. Harvie?

Q No, month by month. We will take possibly the month of July, in that month there are a great many accounts that come within the minimum rate?

A Yes.

Q Have you any idea of the figures?

A No, not offhand.

Q I wonder if you could make an analysis of that for the year 1944 or for the year 1945, whichever you wish?

A The second rate, No. 2, you have in mind, for the month of July, the number of customers whose bill is $1.50?

Q I will put it this way, I would like to know the number of customers that paid the minimum rate either under the old general rate No. 1. or the combined rate, No. 2, both of which are applicable in this case, in some cases, that pay the minimum rate, in the month that they are most applicable.

A I will see what I can do with that, Mr. Harvie.

Q And you might also let me know how many also pay the minimum rate, we will say, in the month that there are the least number that pay it.

A I will do that.

THE CHAIRMAN: Then we will adjourn until 9.15 tomorrow morning.

(The Hearing was here adjourned, to be resumed at 9.15 A.M. January 23rd, 1945.)

.....